POPULAR SCIENCE

MONTHLY

MECHANICS - AUTOS - HOMEBUILDING

June 35¢

How to Build a

Beginner's Diving Outfit

PAGE 163

NOW! GO FISHIN' WITH A *Quiet* OUTBOARD MOTOR

NEW JOHNSON SEA-HORSE 5½

- ***Entirely New! Entirely Different!***
- ***Suspension Drive—Quiet! No Vibration!***
- ***Air Intake and Exhaust Relief Silencers!***
- ***Full Gear Shift—forward, neutral, reverse!***
- ***Up-and-Off Motor Hood!***
- ***Mile-Master Fuel System!***
- ***Twist-Grip Speed Control!***
- ***Fitted for Ship-Master Remote Control!***
- ***Hi-torque Power—5½ hp!***

Never before have so many fine features been concentrated in a motor of this trim size—*the popular size that outsells all others!* Here at last are "big motor" developments with small motor handling ease. *Plus Johnson's revolutionary Suspension Drive that dissipates vibration and reduces noise!* See your Johnson Dealer. (Look for his name under "Outboard Motors" in your classified telephone book.)

The first outboard motor ever to win a citation from the National Noise Abatement Council.

Another Great Fishin' Favorite!

The little motor with the big push—32-lb. TWIN, 3 hp! Amazing Angle-matic Drive takes you where others dare not venture! Slides thru weeds, skis over underwater obstructions, keeps driving in *inches* of water.

JOHNSON SEA-HORSE 3

FREE! New Sea-Horse catalog, packed with information on Johnson's latest, *and greatest*, developments. New features fully described. Complete specifications on all models. Write for your copy.

JOHNSON MOTORS, 500 Pershing Road, Waukegan, Illinois

In Canada: Manufactured by Johnson Motors, Peterborough

THE NEW 1954 SEA-HORSES

ELECTRIC STARTING SEA-HORSE 25—25 hp. The "automatic" outboard	**$498.00***
SEA-HORSE 25—25 hp. Ready-Pull starting	**$410.00***
SEA-HORSE 10—10 hp. Brilliant "all-around" performance	**$297.50***
SEA-HORSE 5½—5½ hp. New Suspension Drive sensation	**$210.00***
SEA-HORSE 3—3 hp. Rugged 32-lb. TWIN	**$145.00**
SHIP-MASTER REMOTE CONTROL—For shift and throttle. Fits Sea-Horse 5½, 10, and both 25's. From	**$29.50**

Prices f.o.b. factory, subject to change. OBC certified brake hp at 4000 rpm.
**Includes Mile-Master Fuel System.*

Johnson SEA-HORSES FOR DEPENDABILITY

Copyrighted material

THIS 1940 FORD HAS GONE 148,000 MILES WITHOUT OVERHAUL

. . . YET THE ENGINE IS AS POWERFUL AS NEW

Winthrop A. Johns and the original test car — says Win: "I don't expect to live long enough to wear this engine to the first overhaul! At the present rate of wear it will run at least 700,000 miles."

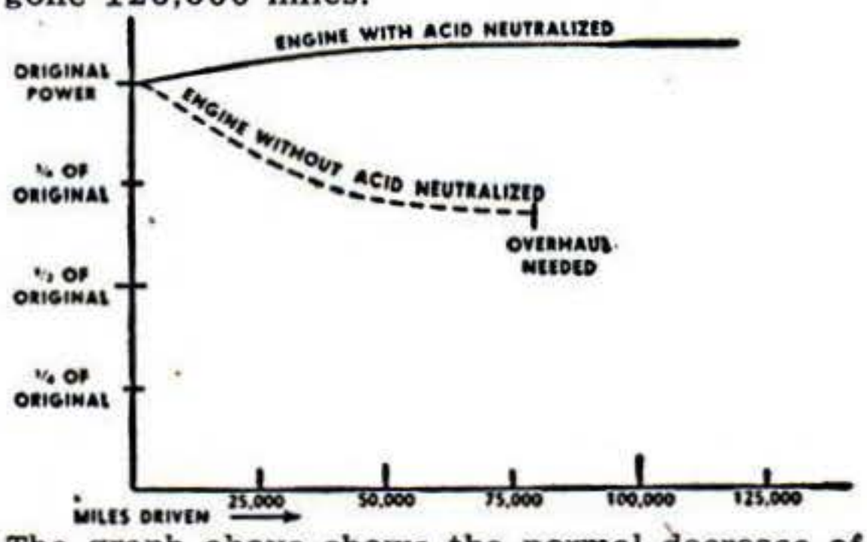
THIS CAR, AND Hundreds of Other Test Vehicles Are Revolutionizing Motor History By Means of a Special New Device that Neutralizes Corrosive Acids as They Are Formed!

HERE IS PROOF

These are FACTS gathered in 13 years of road tests over millions of miles in 1500 cars and trucks—NOT laboratory tests under simulated conditions.

1. POWER

No engine tested decreased in power. Many have gone 120,000 miles.



The graph above shows the normal decrease of engine power, compared with the power output of engines protected from acids. Top performance is yours almost indefinitely—one, two, five or even ten years. Most protected engines are outlasting their bodies.

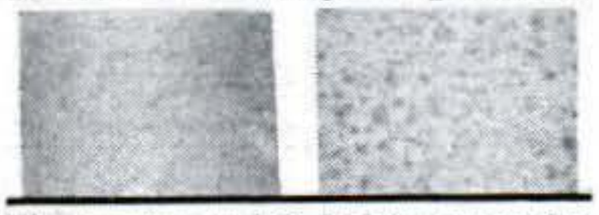
2. IGNITION

Spark plugs last up to 60,000 miles—waste less gas. The two spark plugs shown are from a set of 8 after 60,000 miles—the entire set still testing 93% efficient!

Actual photo after 61,810 miles, showing good condition of the electrodes.

3. FRICTION WEAR ALMOST DISAPPEARS

Fleet tests show wear reductions of almost 6 to 1 in stop and go service.



The bearing at left is from an engine with Magna-Power after 112,000 miles in 11 years. It is still good for many more years and 4 times the miles. At right, one from an unprotected engine after 63,000 miles; WORN OUT!

IS IT ACID OR FRICTION?

Engine friction—excepting fans, pumps, belts and windage—is negligible. Our tests show almost no metal to metal contact. Acid is the real cause of motor deterioration.

SULPHUR FORMS ACIDS

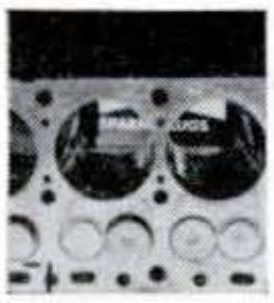
Gasoline is about 1/1000th sulphur. Leaded gasoline also contains bromine and chlorine. In 1000 gallons (enough for 15,000 to 20,000 miles) there is about 6 lbs. of sulphur—enough to make 5 gallons of strong sulphuric acid. When gasoline burns, corrosive gases (SO_2 SO_3 HBr and HCl) blow by the pistons into the crankcase. Here they combine with condensed water (also blown by) almost always present in oil, to start a vicious circle. SO_3 is a thirsty compound. It absorbs water to form sulphuric acid, which in turn attracts more water, which dissolves more SO_3, which in turn attracts more water! This water body then absorbs gases to form H_2CO_3, H_2SO_3, HCl and HBr—all corrosive acids. Acids cannot work without water—but your engine makes large amounts of it—about a gallon for each gallon of gas; you have seen it drip from your exhaust!

ENGINES HAVE SHORT LIFE

In door to door service some have an appallingly short life. Often only 15,000 to 20,000 miles! Enough materials blow into the crankcase to make a pint of acid a day. Most of these are removed by ventilation but the small amount left is enough to damage your engine seriously. Even carbonic acid, which you drink in soda pop is powerful enough to corrode iron ⅓ inch per year.

NEW DIRECT WAY TO KILL ACIDS

Acids destroy themselves by eating metals. Acids attack first metals most easily eaten. Almost perfect protection is obtained by a special alloy of MAGNESIUM and aluminum. Since magnesium is by far the most easily attacked metal in the engine, the acids eat it and are destroyed. Without acids, water is no longer held. Without water acids cannot form. The vicious circle is interrupted. Less sludges, gums and resins are formed.



At left above are two cylinders of a milk truck at 65,000 miles with Magna-Power. It is ¼ worn out. Identical engines in the same fleet but without Magna-Power wore out completely at 40,000 miles. At right are shown several large city buses—part of the extensive fleet testing program.

A Magna-Power acid neutralizer. Pat. Appl. for.

SUMMARIZING:

Normal wear, as you know it, does not exist. Manufacturer's figures are increased up to 10% in economy, speed, power. Engine wear life is increased to at least 300,000 miles by adding the Magna-Power Acid Neutralizer. Magna-Power will help any engine that uses less than 1 qt. of oil each 500 miles, OR YOUR MONEY PACK.

GET ONE NOW FOR YOUR NEXT OIL CHANGE—

The gasoline you buy has sulphur in it. When sulphur burns it forms sulphuric acid. Sulphuric acid eats metal. Little by little your engine is eaten away. To combat this damage, many oil companies are now using anti-acids in their oils. But what happens when these compounds are overcome? Your engine corrodes once more!

Acid is one of nature's methods of reducing refined metals to their original primitive state. Even the Shell Oil Co. has now proven that acid corrosion is the major cause of engine wear!

There Is Only One Way to Safely Inhibit Acid Formation in Your Engine

Of course, if you choose to carry testing apparatus (litmus paper or some such other device) you might be able to tell when your oil is becoming acid, due to the destruction of the anti-acid compounds. But the easiest way, it seems to us, is to use a metal plug of MAGNESIUM and aluminum, which is by nature an alkaline metal, and which, attached to your oil drain plug, permits easy inspection at the time you change your oil. Thus you can see at a glance, by means of observing the state of corrosion of the plug, whether or not your engine is being attacked. For acids much prefer alkaline metals such as magnesium for "lunch," to the other metals in the engine.

This is a Very Simple Idea

However, it was developed by a mechanical engineer after many years of trial and error, using such compounds at first as potash, magnesium shavings and other devices, none of which were as easy, simple or positive as this new oil-drain plug device.

It Is Thoroughly Tested

Milk fleets, passenger cars, bus lines and trucking companies all have tested the new "Magna-Power" Neutralizer in controlled field operations. Their enthusiastic letters are available for your inspection at any time.

You Can See the Action in a Few Seconds

If you take a Magna-Power Neutralizer and drop it into a glass of vinegar you will see it foam wildly. Even grapefruit juice will cause an effervescent action.

Experiment with the Magna-Power Neutralizer at OUR Risk

If you are not satisfied with the way it works send it back, at any time (years from now, if you choose), for an immediate refund.

Johns Manufacturing Company, Dept B-6, Dunellen, N. J.

JOHNS MFG. CO.,
Dept. B-6, Dunellen, N.J.

My car is a . . . . . (make)
. . . . . year.

Please send me, postpaid, a MAGNA POWER acid neutralizer. I enclose $2.95. I understand that it is sold with an unconditional guarantee of satisfaction or my money back!

Name . . . . . .
Street . . . . . .
City . . . . . Zone . . . State . . .

© 1954 John Shrager Inc. Adv.

Copyrighted material

America's Leading New-Idea Magazine for 82 Years

Founded 1872,
Vol. 164: No. 6

POPULAR SCIENCE

REG. U. S. PAT. OFF. *Monthly*

Mechanics and Handicraft
REG. U. S. PAT. OFF.

June, 1954 **Page**

"You Save Gas by Safe Driving"..... 81
They're Parking a Submarine..... 86
Want to Climb a Mountain?..... 90
What Makes the Earth Wobble..... 96
Wilbur Shaw Drives the Buick Century.....101
Atom Missile Outshoots Biggest Guns.....104
How to Fight Mosquitoes.....108
Aircraft Engines You'll See in '64.....114
Look What's Happened to Trailers.....116
The Sooners' Speedway Is a Safeway, Too..128
How Not to Drive a Tractor.....133
The Car That Has Changed the Most.....138
Niagara Gets a Face Lift.....144
Atomic Miracles Are Nearer Now.....151
Industry Bids High for Bright Ideas.....155
Gus Lends Luck a Hand.....160

SPECIAL 13-PAGE SECTION ON

America's Fastest-Growing Sport

Exploring Underwater Playgrounds....163
How to Build a $15 Diving Outfit.....164
How to Make Swimming Accessories....172
Diving Gear You Can Buy.....174

The Other Fellow's Shop.....177
Pointers on Portable Electric Saws.....182
Modern Designs Cut Cost of Furniture.....192
Back-Yard Play Platform.....195
Sun and Wind Screens for Your Home.....199
How to Buy Binoculars.....203
Building a Two-Way Lawn Chair.....210
Driftwood Lamps Dress Up a Room.....216
Cutting Board Stores Knives, Too.....216
Tin Fish Below Boat Warns of Shallows....226
6 Ways to Make Power Turn Corners.....235

(More features and departments are listed on page 4)

Editor
VOLTA TORREY

Managing Editor
HOWARD ALLAWAY

Art Editor
HOWARD C. JENSEN

Associate Editors
Alden P. Armagnac, Devon Francis, Sheldon M. Gallager, Wesley S. Griswold, Herbert O. Johansen, Martin Mann, Herbert R. Pfister, Ruth Westphal.

Art
Harry Samuels (Director), Herbert Anthony, Gene Butera, Henry B. Comstock, Mary E. Dee, Eric A. Karminski Jr., Laylen H. Sweet.

Copy
Kendall W. Goodwyn (Director), Carol Ennis, Everett H. Ortner, Georgette Sparks.

Photography
W. W. Morris (Director), Hubert Luckett, Orlando Guerra.

Assistant Managing Editors
Frank Rowsome Jr.
Robert P. Stevenson

Mechanics and Handicraft
Harry Walton

Midwestern Editor
Kenneth Wylie (Chicago)

Western Editor
Andrew R. Boone (Los Angeles)

Editorial Assistants
Harriet Trowbridge, Stanley Beitler, Louise Levis, Trudie Ray, Teresa Robbins, Rose Weil.

Publisher
GODFREY HAMMOND

Advertising Director
STEPHEN P. GLENNON

Circulation Director
EUGENE WATSON

ADVERTISING OFFICES: NEW YORK—353 Fourth Ave.; CHICAGO—360 North Michigan Ave.; DETROIT—820 Book Bldg.; SAN FRANCISCO—114 Sansome St.; CLEVELAND—328 Citizens Bldg.; LOS ANGELES—1127 Wilshire Blvd.

EDITORIAL OFFICES: 353 Fourth Avenue, New York 10, N. Y.

Published monthly at 353 Fourth Avenue, New York 10, N. Y., by Popular Science Publishing Co., Inc., Godfrey Hammond, President and Treasurer; R. C. Wilson, Stephen P. Glennon, Vice-Presidents; F. W. Briggs, Secretary. Entered as second-class matter Dec. 28, 1918, re-entered as second-class matter July 26, 1948, at the Post Office in New York, N. Y., under the act of March 3, 1879; additional entry as second-class matter at Dayton, Ohio. Entered as second-class matter at the Post Office Department, Canada. Printed in U.S.A.
Copyright, 1954, by Popular Science Publishing Co., Inc. All rights reserved in the United States, Great Britain, and in all the countries participating in the International Copyright Convention and Pan-American Copyright Convention.
Yearly subscriptions to United States, its possessions and Canada, $3.00 (2 years, $5.50; 3 years, $7.50); foreign countries $1 per year extra. Four weeks' notice is needed to change a subscriber's address. Please give both old and new addresses, including postal zone numbers.

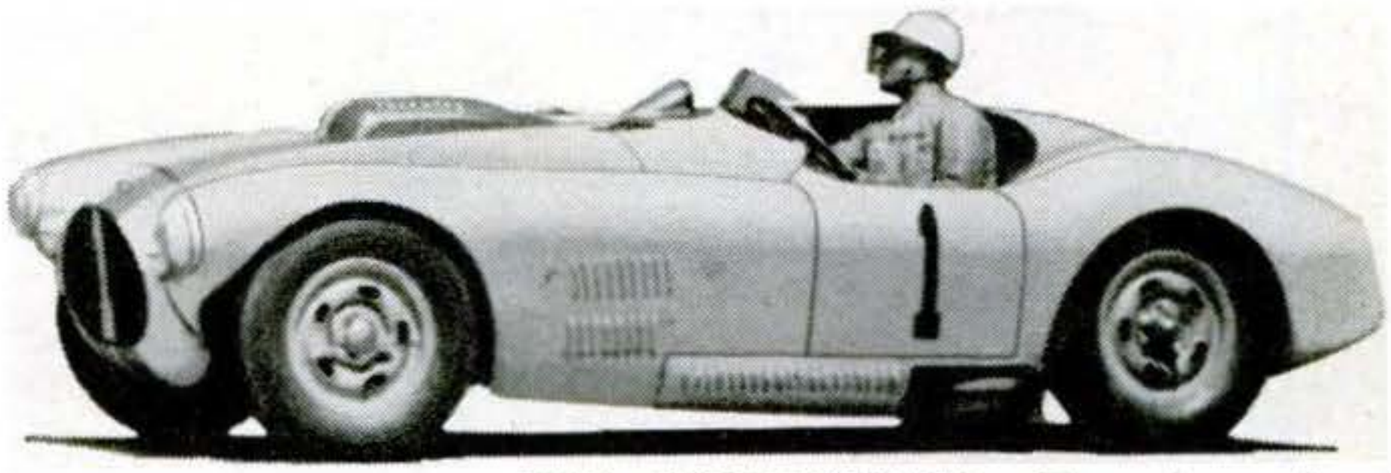
CHOOSE SPARK PLUGS FOR QUICK ACCELERATION AND YOU'LL CHOOSE CHAMPIONS!

Sports car owners demand quick acceleration for sharp turns and fast straightaways. That's why Champion Spark Plugs are overwhelming favorites.

Engines equipped with Champions respond instantly at all speeds without lag or miss, making them consistent winners in every type of competition.

In your own car there are many times when you need extra pick-up to pass a slow-moving vehicle or to pull yourself out of a tight spot safely. Get full-firing Champions for your car — they'll give you instant acceleration at all speeds.

CHAMPION SPARK PLUG COMPANY, TOLEDO 1, OHIO



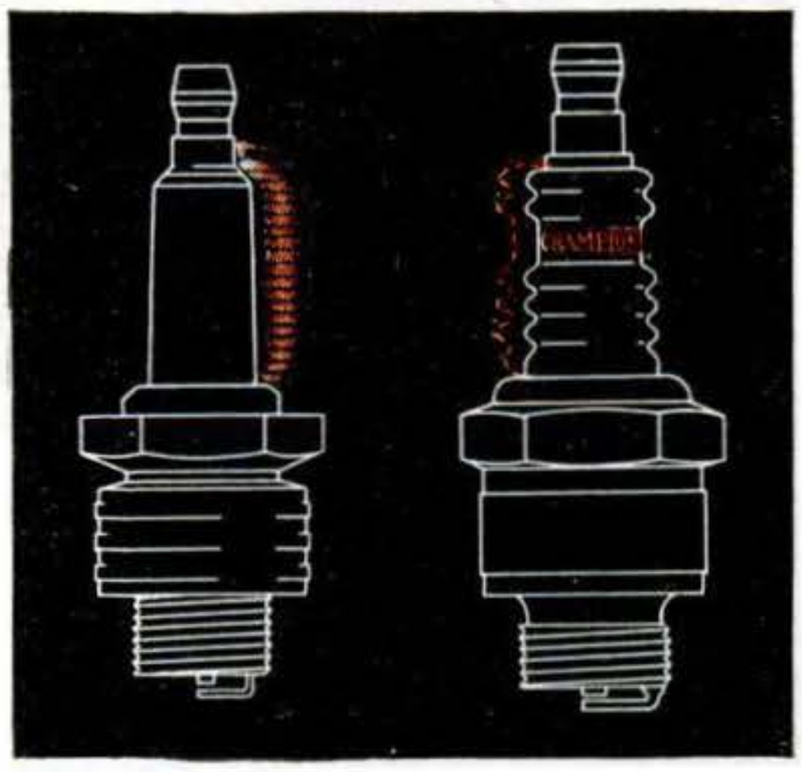
THE CUNNINGHAM — Champion-equipped, these American cars have scored many victories, including the 1953 Sebring Grand Prix.

THE AUSTIN-HEALEY—Broke more than 100 records on Bonneville Salt Flats running on Champion Spark Plugs.

THE JAGUAR 120 C—Won 1953 LeMans—world's greatest sports car race. All Jaguars are fitted with Champions.

THE LANCIA—These new cars bearing the long-famous name and using Champions won the 1953 Mexican Road Race.

THE FERRARI—Champion-equipped 4.5 litre Ferraris have scored 1954 victories at MacDill, Hunter and Bergstrom Air Base races and in the 625-mile Argentine classic.



Only Champion Has 5-Rib Insulators to Assure You Split-Second Starts!

Here's why Champions give you faster starting. Laboratory tests prove Champion's exclusive 5-rib insulator resists "shorting" or "flashover" up to 40% more than ordinary smooth insulator plugs because the path the electricity is forced to take is greater.

DEPENDABLE

CHAMPION

SPARK PLUGS

MAKE ANY CAR RUN BETTER

Copyrighted material

Try the sensational PROTO No. 234 Multi-Purpose Plier and you will want one for sure! Using a patented three-piece compound leverage design, pressure applied to the handles is increased *ten times* at the jaws! This plier is actually "a chest of tools in one." It securely holds square, round and even tapered objects. To make your work easier, buy one today!

Choose PROTO for Your Other Plier Needs

In the extensive PROTO line, you will find the right size and style of plier for almost every job. And remember that every one has true *professional quality*. Send 10¢ for complete 68-page catalog to

PLOMB TOOL COMPANY

2257A Santa Fe Ave.,
Los Angeles 54, Calif.

New—the No. 243 Multiple-Groove Joint Plier, which Handles Hundreds of Jobs. Five-Position, Tongue-and-Groove Joint Prevents Slippage.

5384

PROTO TOOLS ®
PROTO means PROfessional TOols

Eastern Factory: Jamestown, N.Y.
Canadian Factory: London, Ont.

News and Pictures

Swimming Hole Needs No Hole..... 89
Gypsy Gear from Europe..... 94
Steam Whaleboat Pretends It's a Ship....124
Motor Chair Goes Up and Down Curbs..126

Mechanics and Homebuilding

How to Make a Tin-Can Barbecue.....191
6 Uses for Rubber Balls.....194
Modern Chessmen Made of Dowels.....198
Tilt-Out Bin Hides Garbage Can.....218
Could You Build This Trick Lamp?.....219
Drill Is Useful in Kitchen.....228
Plastic Ornaments Look Like Metal.....240

Departments

Letters 12
Last-Minute News and Notes..... 76
New Ideas from the Inventors.....121
I'd Like to See Them Make.....132
New for the Handy Man.....187
Keeping the Home Shipshape.....189
New Tools 207
Wordless Workshop.....208
New Shop Ideas.....223
Craftsmen at Work.....244
Hints from the Model Garage.....247
How Much Did You Learn?.....278

Man Behind the By-Line

THAT persistent AC hum heard in PSM offices isn't a defective fluorescent—it's Wesley S. Griswold, one of the magazine's most productive editors. Almost every issue will carry a major piece by him, and most will show his proficient but unsigned touch on half a dozen other articles. A general-assignment man in a crew of specialists, Wes has turned his typewriter on everything from atomic energy to Detroit iron to plastic fishing lures.

A not-so-old pro, Wes has put in 11 years as a newspaperman and almost nine as a magazine editor—five as staff man for *The New Yorker* and the remainder with PSM. His keyboard skills aren't limited to the typewriter—he also plays a real gone piano.

This month don't miss his "The Car That Has Changed the Most" (page 138).

Copyrighted material

How to look good to your boss

The old tricks of "flattery" and "bluff" no longer work—though men still try them. Here's a new technique that seems to be paying off.

WITHIN the next twelve months, someone you work with will hit the jackpot on promotion. Overnight he'll jump to a key position—and everybody will wonder why.

Chances are, he's cashing in on a new way to impress the boss—*self-improvement on the QT.*

With jobs getting tighter, employers are giving the cold eye to men who obviously are trying to make an impression without anything to back it up. The phony eager beavers, overtime hounds and front office pets are due for a rude awakening.

Sincerity, honest work and *interest beyond the job* are getting the nod. And top dog is the man who uses his *spare* time to train for advancement.

I.C.S. sees this showing up in a great new surge of interest in advanced technical and business courses.

Men who look into correspondence training are suddenly clipping coupons and enrolling. Current I.C.S. students include a good many college graduates. Also engineers seeking courses in business management. And men who need a quick brush-up or refresher course.

Says James L. Morgan of the Morgan Cotton Mills, Inc., "We keep an eye on our I.C.S. students. They may study alone at home. But the results show up in their work—and make possible promotions otherwise impossible." Mr. Morgan speaks from experience—his own I.C.S. experience.

For Real Job Security — Get I.C.S. Training! **I.C.S., Scranton 9, Penna.**

INTERNATIONAL CORRESPONDENCE SCHOOLS ICS

BOX 7680-N, SCRANTON 9, PENNA. (Partial list of 277 courses)

Without cost or obligation, send me "HOW to SUCCEED" and the opportunity booklet about the field BEFORE which I have marked X:

ARCHITECTURE and BUILDING CONSTRUCTION
- ☐ Air Conditioning—Refrig.
- ☐ Architecture
- ☐ Building Contractor
- ☐ Building Maintenance
- ☐ Carpenter and Mill Work
- ☐ Estimating
- ☐ Heating
- ☐ Painting Contractor
- ☐ Plumbing
- ☐ Reading Arch. Blueprints
- ☐ Steamfitting

ART
- ☐ Cartooning
- ☐ Commercial Art
- ☐ Fashion Illustrating
- ☐ Magazine Illustrating
- ☐ Show Card and Si
- ☐ Sketching and Paintin

AUTOMOTIVE
- ☐ Auto Body Rebuilding
- ☐ Auto Elec. Technician
- ☐ Auto-Engine Tune Up
- ☐ Automobile Mechanic

AVIATION
- ☐ Aeronautical Engineering Jr.
- ☐ Aircraft & Engine Mechanic

BUSINESS
- ☐ Advertising
- ☐ Bookkeeping and Accounting
- ☐ Business Administration
- ☐ Business Correspondence
- ☐ Certified Public Accounting
- ☐ Creative Salesmanship
- ☐ Federal Tax
- ☐ Letter-writing Improvement
- ☐ Managing Small Business
- ☐ Office Management
- ☐ Retail Business Management
- ☐ Sales Management
- ☐ Stenographic-Secretarial
- ☐ Traffic Management

CHEMISTRY
- ☐ Analytical Chemistry
- ☐ Chemical Engineering
- ☐ Chem. Lab. Technician
- ☐ General Chemistry
- ☐ Natural Gas Prod. & Trans.
- ☐ Petroleum Engineering
- ☐ Plastics
- ☐ Pulp and Paper Making

CIVIL, STRUCTURAL ENGINEERING
- ☐ Civil Engineering
- ☐ Construction Engineering
- ☐ Highway Engineering
- ☐ Reading Struct. Blueprints
- ☐ Sanitary Engineering
- ☐ Structural Engineering
- ☐ Surveying and Mapping

DRAFTING
- ☐ Aircraft Drafting
- ☐ Architectural Drafting
- ☐ Electrical Drafting
- ☐ Mechanical Drafting
- ☐ Mine Surveying and Mapping
- ☐ Ship Drafting
- ☐ Structural Drafting

ELECTRICAL
- ☐ Electrical Engineering
- ☐ Electrical Maintenance
- ☐ Electrician ☐ Contracting
- ☐ Lineman

HIGH SCHOOL
- ☐ Commercial
- ☐ Good English
- ☐ High School Subjects
- ☐ Mathematics

LEADERSHIP
- ☐ Foremanship
- ☐ Industrial Supervision
- ☐ Leadership and Organization
- ☐ Personnel-Labor Relations

MECHANICAL AND SHOP
- ☐ Gas—Electric Welding
- ☐ Heat Treatment ☐ Metallurgy
- ☐ Industrial Engineering
- ☐ Industrial Instrumentation
- ☐ Industrial Supervision
- ☐ Machine Design-Drafting
- ☐ Machine Shop Inspection
- ☐ Machine Shop Practice
- ☐ Mechanical Engineering
- ☐ Quality Control
- ☐ Reading Shop Blueprints
- ☐ Refrigeration
- ☐ Sheet Metal Worker
- ☐ Tool Design ☐ Toolmaking

RADIO, TELEVISION
- ☐ Electronics
- ☐ Practical Radio—TV Eng'r'ng
- ☐ Radio and TV Servicing
- ☐ Radio Operating
- ☐ Television—Technician

RAILROAD
- ☐ Air Brakes ☐ Car Inspector
- ☐ Diesel Locomotive
- ☐ Locomotive Engineer
- ☐ Section Foreman

STEAM AND DIESEL POWER
- ☐ Combustion Engineering
- ☐ Diesel—Elec. ☐ Diesel Eng's
- ☐ Electric Light and Power
- ☐ Stationary Fireman
- ☐ Stationary Steam Engineering

TEXTILE
- ☐ Carding and Spinning
- ☐ Cotton, Rayon, Woolen Mfg.
- ☐ Finishing and Dyeing
- ☐ Loom Fixing
- ☐ Textile Designing
- ☐ Textile Eng'r'g ☐ Throwing
- ☐ Warping and Weaving

MISCELLANEOUS
- ☐ Domestic Refrigeration
- ☐ Marine Engineering
- ☐ Ocean Navigation
- ☐ Shipfitting
- ☐ Short Story Writing
- ☐ Telephony

Name_____ Age_____ Home Address_____

City_____ Zone_____ State_____ Working Hours_____ A.M. to P.M._____

Occupation_____

Canadian residents send coupon to International Correspondence Schools, Canadian, Ltd., Montreal, Canada. . . . Special tuition rates to members of the U. S. Armed Forces.

Copyrighted material

SPLITTING HAIRS

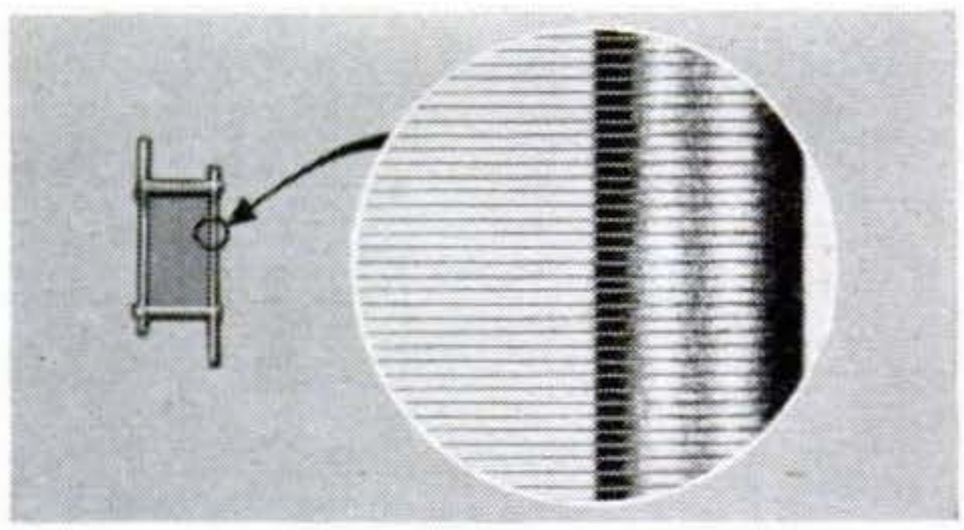
TO SPEED CALLS

This coaxial system electron tube amplifies more voices at the same time because of wider frequency band – made possible by bringing grid and cathode closer together.

To triple the voice-carrying capacity of coaxial cable, Bell Laboratories engineers had to create new amplifying tubes with the grid placed only two-thirds of a hair's breadth from the cathode. Furthermore, the grid wires had to be held rigidly in position; one-quarter of a hair's shifting would cut amplification in half.

Working with their Bell System manufacturing partners at Western Electric, the engineers developed precise optical means for measuring critical spacing insulators. On a rigid molybdenum grid frame they wound tungsten wire three ten-thousandths of an inch thick. To prevent the slightest movement they stretched the wire under more tension for its size than suspension bridge cables, then bonded it to the frame by a new process.

The resulting tube increases coaxial's capacity from 600 to 1800 simultaneous voices—another example of how Bell Telephone Laboratories research helps keep your telephone system growing at the lowest possible cost.



Actual grid is shown above on left. Enlarged picture at right shows how wires are anchored by a glass bond. They will not sag despite nearness of red-hot cathode.

BELL TELEPHONE LABORATORIES

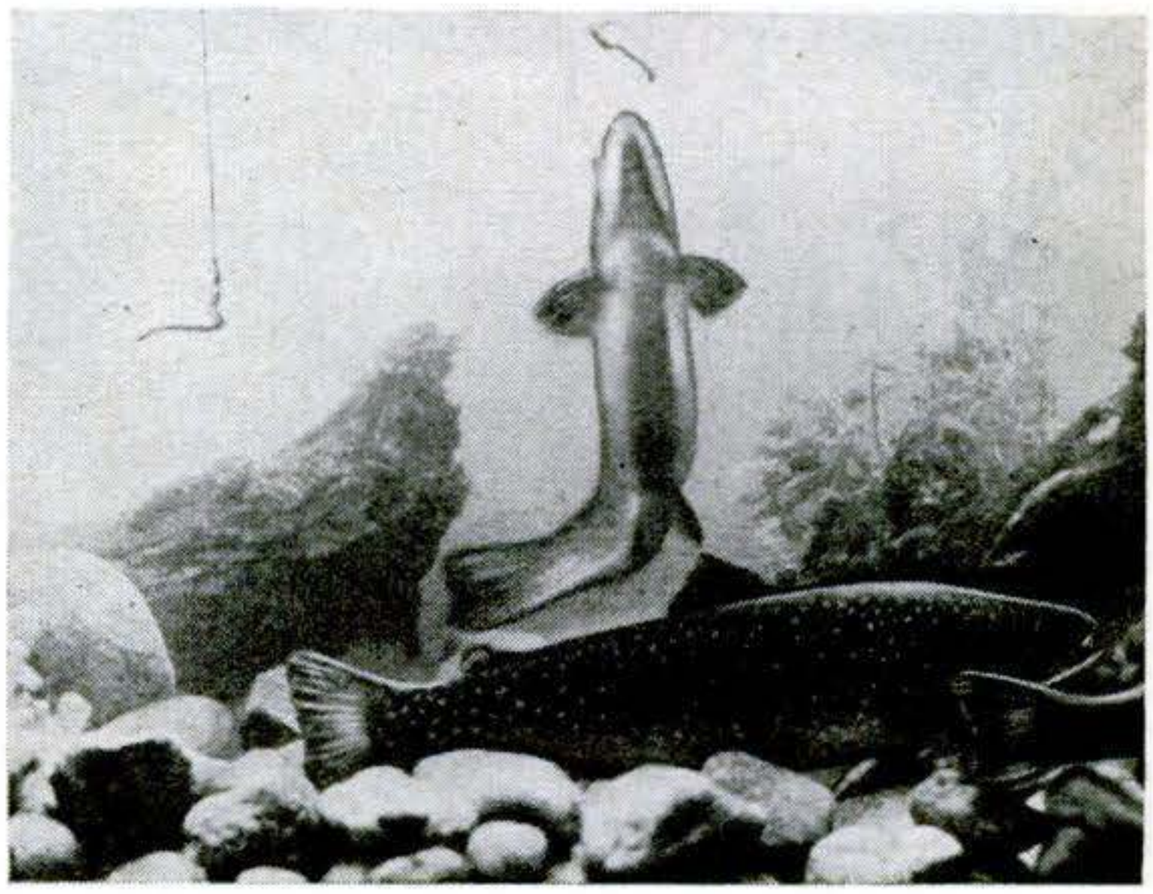
IMPROVING TELEPHONE SERVICE FOR AMERICA PROVIDES CAREERS FOR CREATIVE MEN IN SCIENTIFIC AND TECHNICAL FIELDS

Copyrighted material

Amazing New Way To Catch More Fish

Scientists Reveal Amazing Results of Laboratory Experiments! Fish Scents Travel Through Water, Draw Fish to Hook, *Make Them Bite!* Fishermen Report Astonishing Success!

Do you ever wonder why you come back from a fishing trip with little more than a sunburn? Does your investment in expensive equipment sometimes bring disappointing results? Well, it may not be the fault of your tackle, lure, or even bait. Your bait would probably look fine to the fish—and they would *love to bite* . . . IF THEY COULD JUST SEE IT! The truth is—most fish are extremely near-sighted . . . many are almost *blind!* Unless your fancy lure happens to land right under the nose of the fish, they might not see it and bite. You can sit for hours without a nibble, while hundreds of fish swim within a stone's throw of your hook. And if you use live bait—the chances are that a fish will not pick *your* bait in preference to all the other good things to eat that live in the same water! The big question is—Is it possible to develop a lure that will attract fish far beyond the range of vision—with an attraction that no fish can resist? Read on—the answer is in this story!



The Same Bait in the Same Spot...But Just Look!

Do fish "take" your bait like this? Do they fight each other to get hooked? Or do they leave your line alone like the hook on the left? In this aquarium test you see two hooks hanging on lines in the same spot with identical bait! The fish was caught on the hook on the right because the worm on that hook was treated with FISH-LURE, the sensational scent that draws fish by smell and taste. This low cost scent comes in tubes, specially blended to appeal to fish. Read this page. Learn how this amazing scent will increase your catch.

Read These Reports By Scientists

Some scientists decided to find out once and for all—**why fish bite!** Five healthy, hungry catfish were placed in an aquarium of water. Also into the water were suspended two **identical** wads of cheesecloth. But buried in the center of **just one** was some **minced earthworm.** The scientists watched the catfish pass by the empty wad dozens of times, never paying any attention to it. But the wad with the earthworm was **attacked eleven times** during the test period!

Now here's the $64 question. How did the fish know which pad contained the earthworm?

"Cats" and "Dogs" Team Up

The tests on the catfish seemed to prove that, although the fish saw two identical wads, some sense led them unerringly to the right one **every time!** What sense? The scientists determined to find out. The "cats" were replaced in the tank by "dogs" . . . or dogfish. When they lower a crushed crab into the water, some unseen message excites the fish. He begins to hunt in an amazing figure-8 pattern. Tighter and tighter become the loops of the figure-8 until Snap!—no more crab!

And then the final test. **Both** of the fish's nostrils are blocked. Again a crab is placed in the tank. What happens? **Nothing!** Not the slightest sign that the fish is aware of the food practically staring him in the face. Experiments like these were performed again and again with various types of fish—fresh and salt water—and the results were always the same.

The conclusion is the same obvious one. Even when the bait was not in sight, the fish tracked it down like bloodhounds. And when it **was** in sight, they still depended on their most reliable senses—**SMELL and TASTE.**

How Professional Fishermen Use This Knowledge of Fish Senses

Did you know that many professionals actually **add smells** to their live bait? It actually increases their catches tremendously. Why? Because untreated bait smells no stronger than all the other fish food in the water, while a very strong smell draws the fish in spite of other temptations. A leading ichthyologist reports " . . . experiments have proven that fish can locate food by the sense of smell and the fact that fishes of many species can be caught on a baited hook, on a dark night or in water so deep that light does not penetrate, certainly indicates that it is smell, not sight, that locates the food in such instances."

Years of research has resulted in the development of a single ALL-PURPOSE scent that attracts fish like magic. This scent is so powerful that one dab is all you need to insure successful results. And now this sensational scent is available to you, under the name of FISH-LURE.

Mr. R. R. W., Northport, L.I., writes:—"I had excellent success with this FISH-LURE and as a result a number of the members of the surf fishing club to which I belong wish to try it."

Fishermen Praise Fish-Lure

Thousands of fishermen have already tried this amazing fish odor. You've never seen such raves! In case after case, fishermen who had been coming back with no fish at all were able to catch quickly their limit of fish. Those big fellows that usually stayed in their deep holes and never took the bait before were drawn by FISH-LURE and hooked! Time and time again, fishermen report how this amazing scent catches full strings of fish while people fishing nearby catch only a few. Professional fishermen were amazed! Amateurs have shocked the experts, by catching big ones where everyone "knew" there weren't any fish.

Don't Throw Away Your Old Bait and Dry Lures

The makers of FISH-LURE do not claim that the type of lure you're now using won't catch fish. But we do say this. No matter what type of fish you're after—trout, bass, sunfish, perch, carp, cat etc.—FISH-LURE will increase your catch—or your money back. Just use the equipment you've always used—PLUS one application of FISH-LURE. Then watch the results. See for yourself how FISH-LURE sends its tantalizing call much further than many fish can see! Compare your catches with anyone using untreated bait! You'll be convinced!

Free Trial Introductory Offer!

Now you can try FISH-LURE under a no-risk money-back guarantee. Each tube of FISH-LURE will treat hundreds of live or dry baits. Simply mail the coupon below, enclosing only $2.00, and your tube of FISH-LURE will be sent to you at once, postpaid. Try FISH-LURE on your next fishing trip. Remember—you must catch fish—more fish than you catch without FISH-LURE—more fish than your friends catch with untreated bait—or your money back. Mail the coupon now!

FISH LURE, Dept. PS-6
144 West 19th St., New York 11, N. Y.

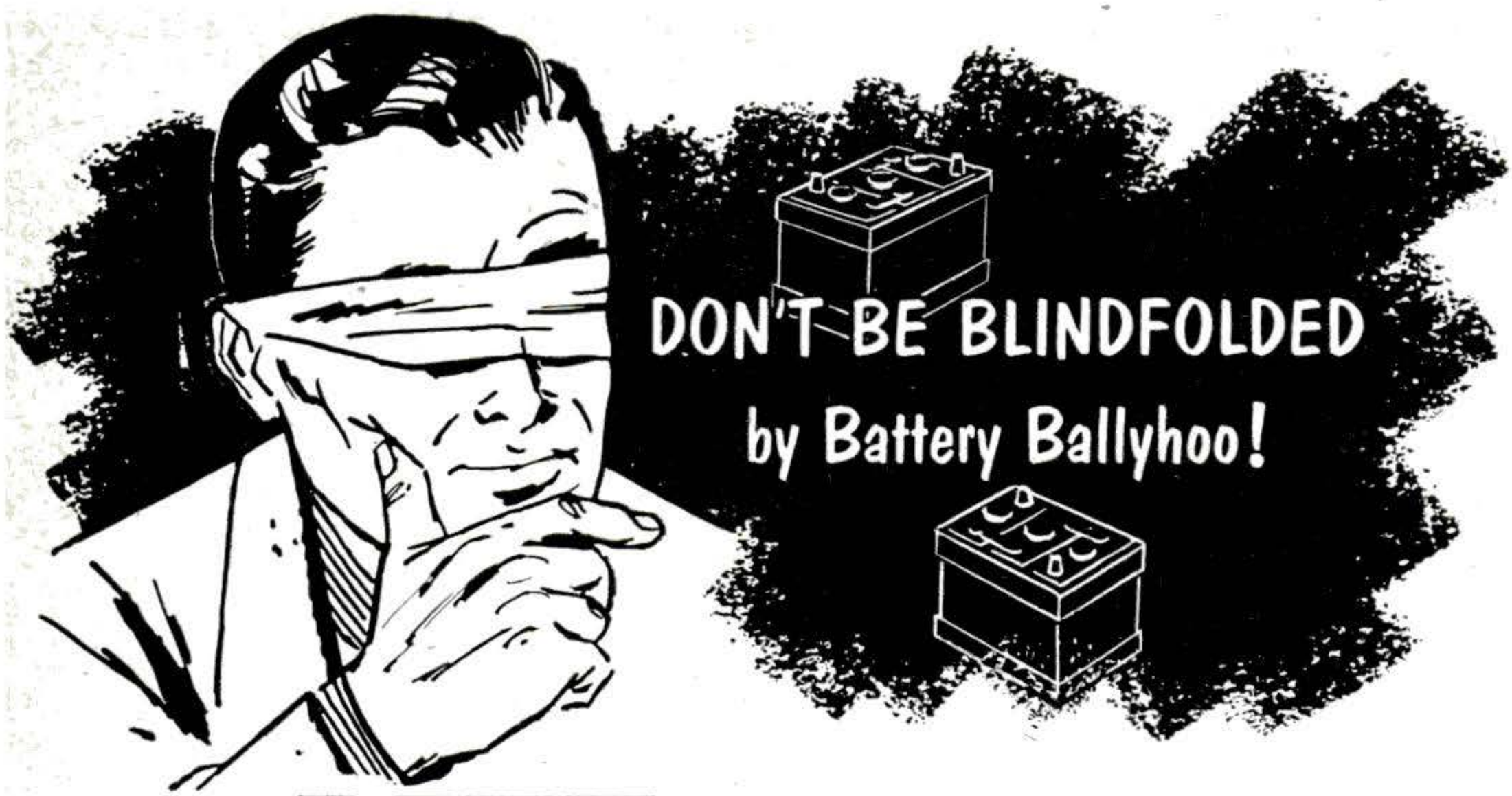
I enclose 2.00 each for.....tubes of FISH-LURE. I understand that this special scent must draw fish to my hook and increase my catch or it will cost me nothing. If I am not delighted with the results, you will refund my money, no questions asked.

NAME.....

ADDRESS.....

CITY.....**STATE**.....

Copyrighted material



LIFE Batteries are Guaranteed for the Life of Your Car

Here's why you will agree LIFE is your best battery buy. There are no tricks or gimmicks, such as pro-rated replacement costs or time limits hidden in the unusual LIFE guarantee. *LIFE BATTERIES are guaranteed for the life of your car* A LIFE Battery ends replacement costs for as long as you keep your car.

If ever found defective, your LIFE Battery will be replaced *free* of *any* cost.

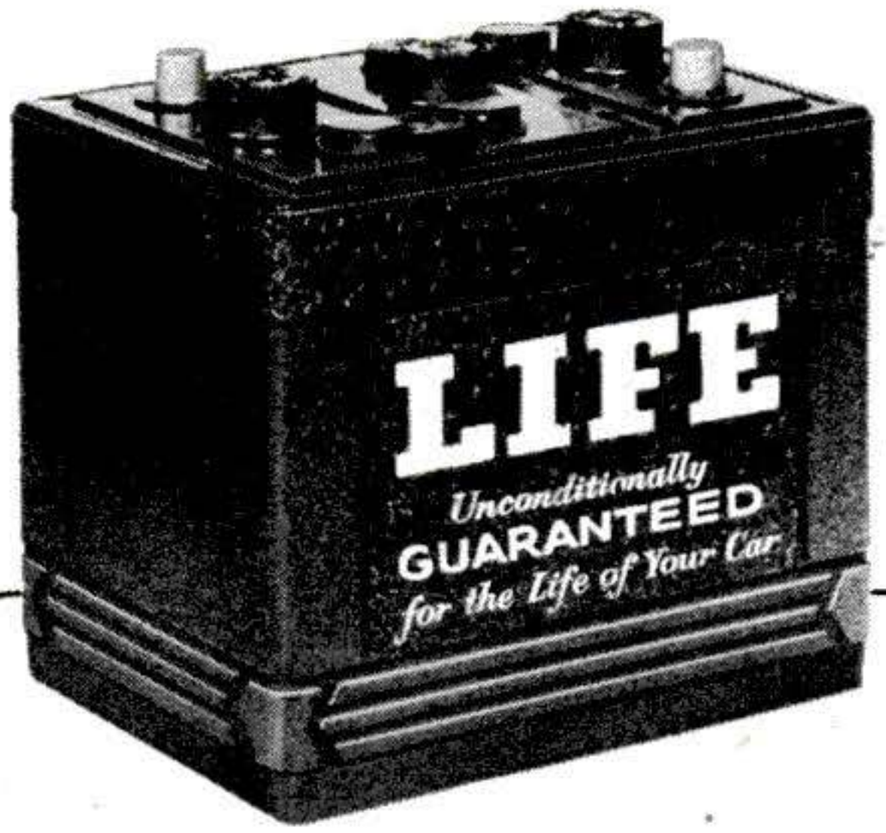
LIFE BATTERIES have been tested under the most rigorous conditions by a leading independent research laboratory before this revolutionary guarantee was offered to you. Before you buy any battery, check with your LIFE representative, or write direct for complete information.

SOME VALUABLE DISTRIBUTOR TERRITORIES STILL OPEN

Qualified people interested in securing exclusive sales areas for Life Batteries are invited to contact us. Minimum investment for inventory only. No charge for franchises. Write, wire or phone today.

LIFE BATTERY CORPORATION

12909 Venice Boulevard, Venice 4, Calif.



NO OTHER BATTERY CAN MAKE ALL THESE STATEMENTS

- Guaranteed for the life of your car
- Unfailing performance under extreme conditions
- First battery to be awarded "Car Life" Seal of Merit
- World's finest battery
- No pro-rated replacement charges
- Phenomenal recuperative power under heavy load
- No time limit to guarantee
- Ends battery replacement costs

Copyrighted material

Wash Your Car in 9 MINUTES

the new *easy* AEROMAT way!

HEAVY DUTY HOME AND CAR WASHER

2 heads are better than 1

◀ Silky Soft BRISTLES

DUPONT Cellulose SPONGE ▶

REGULAR $7.98

NOW ½ PRICE 3.49 PLUS DELIVERY

- **3-FOOT METAL HANDLE**
- **2 INTERCHANGEABLE WASHING HEADS**
- **AUTOMATIC CONTROL VALVE**
- **AERATED WATER FLOW SYSTEM**

Now yours at less than **HALF** its regular price! Just attach the famed **AEROMAT** washer to your garden hose—wash cars, windows, porches, screens, floors, tiles, linoleum, storm windows, walls, exteriors & interiors in a jiffy! **AEROMAT** has 2 interchangeable heads: 1. Non-matting, silky soft Bristle head to get at those hard-to-clean surfaces—so SOFT, so EFFICIENT! 2. DUPONT Cellulose Sponge head for smoother, softer surfaces—for wiping away excess water.

QUALITY MADE BY WORLD'S LARGEST BRUSH FACTORY

AEROMAT is made for extra heavy duty use—it's the product of years of research and experience. It was created to save you time and work. Use any popular detergent such as **VEL, LUX** or **JOY** for fast and thorough cleaning. No hard scrubbing—no back-breaking labor! The free-flowing water, the 2 specially designed heads **AND** the **BUILT-IN** water aerator gives you a perfect cleaning job—**IN FAR LESS TIME.** The long 3-foot metal ductor handle lets you stand clear, avoid splatter.

No need for work clothes. You can wash a car in 9 minutes flat! **AEROMAT** is also equipped with a **RUBBER BUMPER** to prevent scratching. We're able to bring you **AEROMAT** at half price because we contracted for 50,000 sets at a special reduced price. **ACT NOW**—they won't last long. Send **3.49** plus 50c delivery charge **(total 3.99)** in check, cash or m.o. **RUSH** coupon to get yours at half price! (CODs cost 40c more.) 5-Day Money Back Trial.

MOTO-MATIC CO., Dept. 7-F-859
352 Fourth Ave., 7th Floor, New York 10, N.Y.
(CANADIANS: Pay no tariff. Order direct: Moto-Matic Co., Dept. 7-F-859, 45 St. James St. W. 2nd Floor, Montreal 1, P.Q. Send 4.99 total payment. Same trial and guarantee.)

THIS COUPON SAVES YOU ½ PRICE!

MOTO-MATIC CO., Dept. 7-F-859
352 Fourth Ave., 7th Floor, New York 10, N.Y.

Please **RUSH AEROMAT WASHER** at **3.99** on 5-Day Home Trial. **(Price includes 50c delivery charge.)** You are to refund my **3.99** within 5 days if I am not absolutely satisfied.

☐ I enclose 3.99 payment. Send postpaid.
☐ Send C.O.D. plus fees.

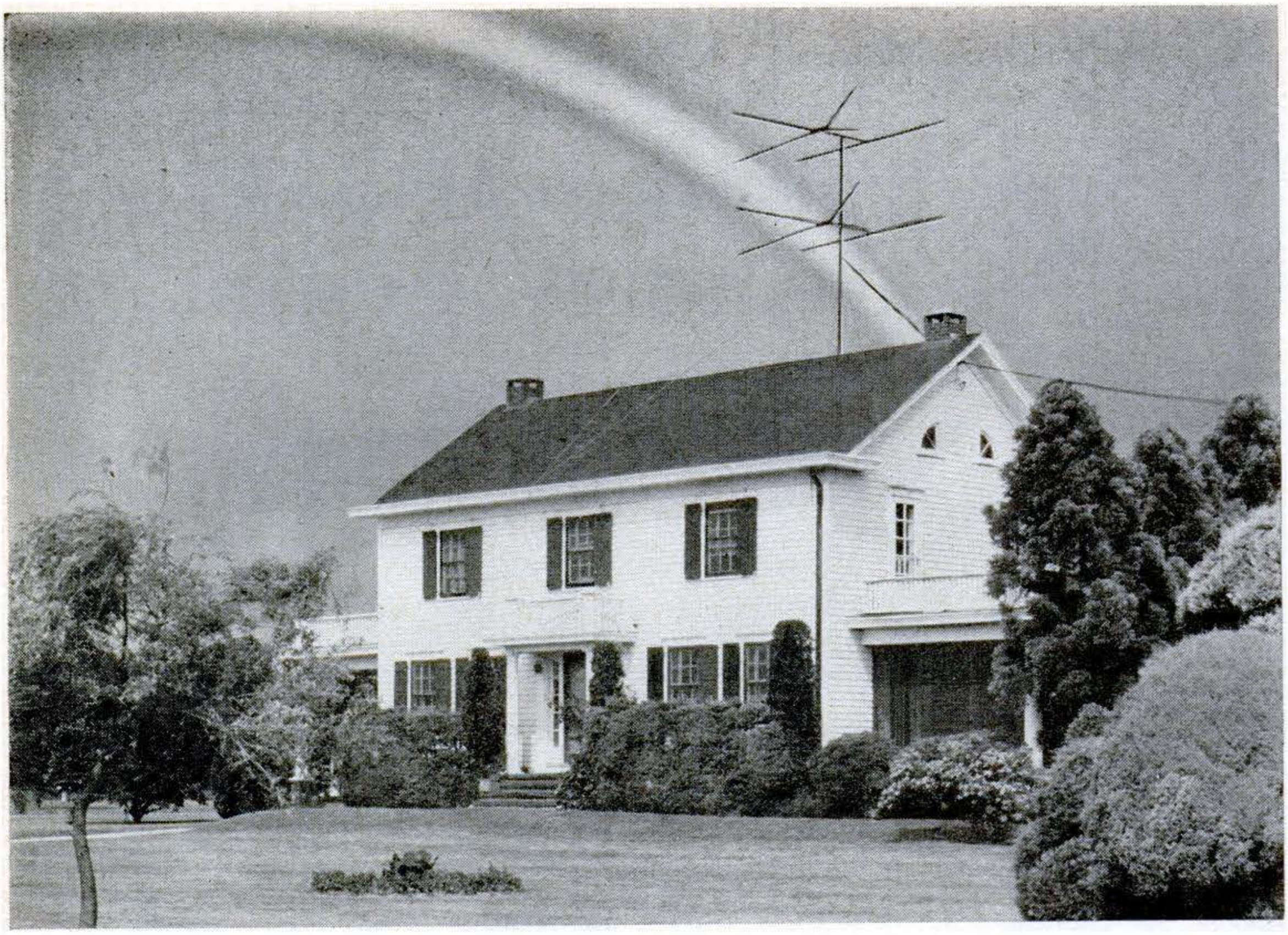
NAME.....

ADDRESS.....

CITY.....ZONE...STATE.....

((CANADIANS: Pay no tariff. Send 4.99 total payment to Moto-Matic Co., Dept. 7-F-859, 45 St. James St. W. 2nd Floor, Montreal 1, P.Q.)

Copyrighted material



Compatible color TV will eventually reach every TV home.

The rainbow you can see in black and white!

RCA brings you compatible color TV. Lets you see color programs in black and white on the set you now own!

"When a modern, practical color television system for the home is here, RCA will have it . . ."

These words—spoken in 1946 by David Sarnoff, Chairman of the Board of RCA—have a ring of triumph today.

The day on which the FCC approved standards for the commercial broadcasting of *compatible color television*—December 17, 1953—will be remembered in the annals of communications along with the historic date of April 30, 1939, when RCA-NBC introduced *black-and-white television*.

At that time sight was added to sound. Now color has been added to sight.

RCA scientists were engaged in research basically related to *color* television as far back as the 1920's . . . even before *black-and-white* television service was introduced.

Since then RCA has spent over $25,000,000 to add the reality of color to black-and-white TV, including development of the tri-color tube.

The fruit of this great investment is the RCA all-electronic compatible color television system, *a system that provides for the telecasting of high-quality color pictures that can be received in full color on color receivers; and in black and white on the set you now own.*

Although it will probably be another year before mass production is reached, the promise of compatible color TV is being fulfilled.

RCA pioneered and developed compatible color television

RCA®

RADIO CORPORATION OF AMERICA

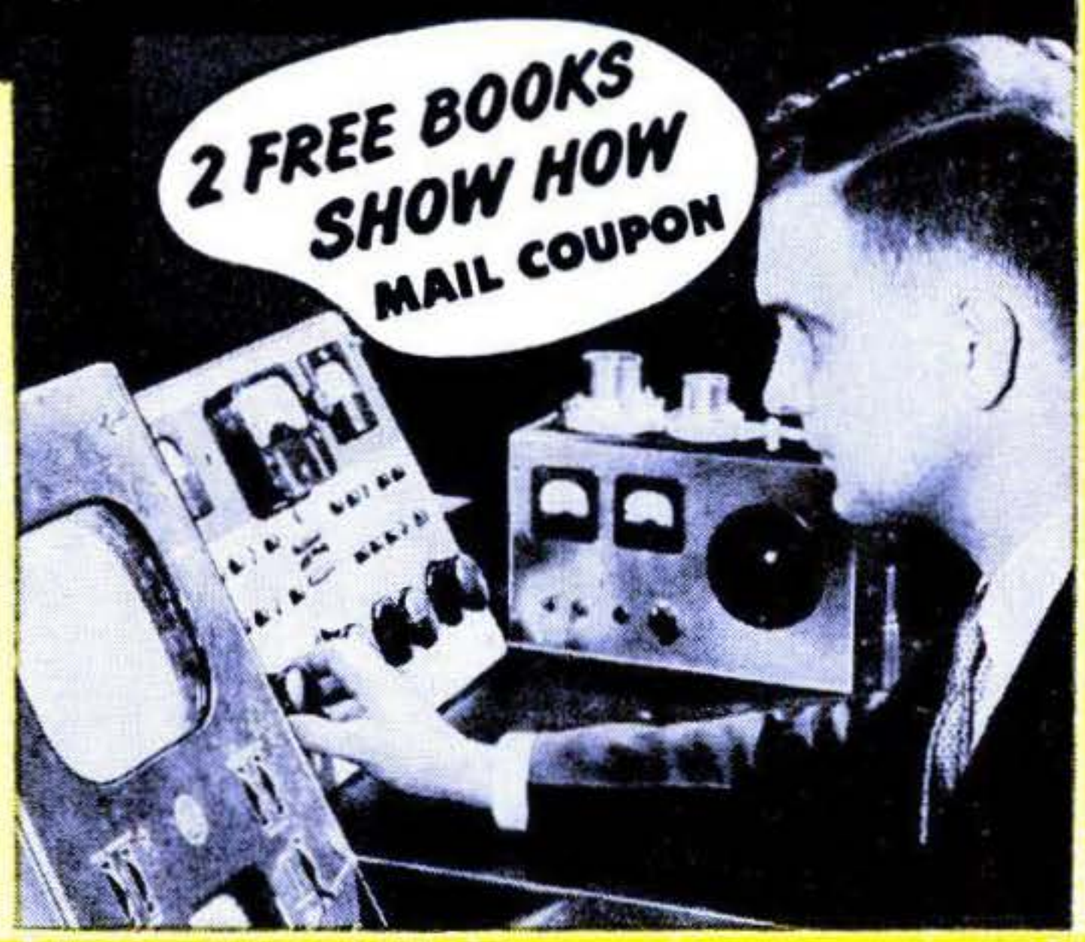
World leader in Radio—first in television

Copyrighted material

Learn to Fix RADIO-TELEVISION Sets, Operate Broadcasting Stations by Practicing at Home in Spare Time

J. E. SMITH has trained more men for Radio-Television than any other man. OUR 40th YEAR.

America's Fast Growing Industry Offers You Good Pay—Bright Future—Security



Television Making Good Jobs, Prosperity—Even without Television, Radio is bigger than ever. 115 million home and auto Radios are big market for servicing. 3000 broadcasting stations use operators, technicians. Government, Aviation, Police, Ship, Micro-wave Relay, Two-way Radio Communications for buses, taxis, trucks, R. R. are growing fields. Television is moving ahead fast.

I TRAINED THESE MEN

"Started to repair sets six months after enrolling. Earned $12 to $15 a week in spare time."—Adam Kramlik, Jr., Sunneytown, Pennsylvania.

"Up to our necks in Radio-Television work. Four other NRI men work here. Am happy with my work."—Glen Peterson, Bradford, Ont., Canada.

"Am doing Radio and Television Servicing full time. Now have my own shop. I owe my success to N.R.I."—Curtis Stath, Ft. Madison, Iowa.

"Am with WCOC. NRI course can't be beat. No trouble passing 1st class Radio-phone license exam."—Jesse W. Parker, Meridian, Mississippi.

"By graduation, had paid for course, car, testing equipment. Can service toughest jobs."—E. J. Streitenberger, New Boston, Ohio.

Training plus opportunity is the PERFECT COMBINATION for job security, good pay, advancement. In good times, the trained man makes the BETTER PAY, GETS PROMOTED. When jobs are scarce, the trained man enjoys GREATER SECURITY. NRI training can help assure you more of the better things of life.

Start Soon to Make $10, $15 a Week Extra Fixing Sets

Keep your job while training. I start sending you special booklets the day you enroll, that show you how to fix sets. Multitester built with parts I send helps you make $10, $15 a week extra fixing sets while training. Many start their own Radio-Television business with spare time earnings.

My Training Is Up-To-Date

You benefit by my 40 years' experience training men at home. Well illustrated lessons give you basic principles you need. Skillfully developed kits of parts I send (see below) "bring to life" things you learn from lessons.

AVAILABLE TO **VETERANS** UNDER G.I. BILLS

You Learn by Practicing with Parts I Send

Nothing takes the place of PRACTICAL EXPERIENCE. That's why NRI training is based on LEARNING BY DOING. You use parts I furnish to build many circuits common to Radio and Television. As part of my Communications Course, you build many circuits, including low power transmitter shown at left. You put it "on the air," perform procedures required of broadcast operators. With my Servicing Course you build modern Radio, etc.; use Multitester you build to make money fixing sets in spare time while training. You can stay at home, keep your job, learn Radio-TV in spare time at low cost. Mail coupon for book showing other equipment you build and keep.

The Tested Way To Better Pay!

About 200 Television stations are now on the air. Hundreds of others being built. Good TV jobs opening up for Technicians, Operators, etc.

25 million homes now have Television sets. Thousands more are being sold every week. Get a job or have your own business selling, installing, servicing.

Radio-TV Needs Men of Action—Mail Coupon

Without obligating you in any way, I'll send an actual lesson to prove that my training is practical, thorough; 64-page book to show good job opportunities for you in Radio-TV. Terms for NRI training are as low as $5 a month. Many graduates make more in two weeks than total cost of training. Mail coupon now. J. E. SMITH, President, National Radio Institute, Dept. 4FB, Washington 9, D. C. OUR 40TH YEAR.

Good for Both—FREE

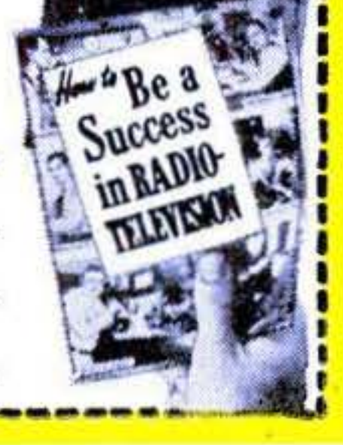
MR. J. E. SMITH, President, Dept. 4FB.
National Radio Institute, Washington 9, D. C.
Mail me Sample Lesson and 64-page Book, FREE.
(No salesman will call. Please write plainly.)

Name.....Age.....

Address.....

City.....Zone....State.....

VETS write in date of discharge .....



Copyrighted material

A SURE CURE FOR SICK HORSEPOWER!

The carbon gums and tars that form in your engine would make you sick too! —These deposits make your engine sluggish—your horsepower balky. Knocks and slow starts are another sign that your engine is gumming up—losing power — wasting gas. Bring your engine back to peak performance with "triple-action" Permatex "Toon-Oyl".

1 **Toon-Oyl dissolves carbon gums, frees sticky hydraulic valves.**

2 **Toon-Oyl reduces friction by coating cleaned parts with a tough lubricating film.**

3 **Toon-Oyl neutralizes acid action—a principal cause of engine wear.**

Get full power from your car. Add a quart of triple-action Permatex "Toon-Oyl" to your engine oil. You'll feel the difference in the first few miles you drive.

Send for free illustrated catalog.

PERMATEX COMPANY, INC.

Brooklyn 35, N. Y.

Over 50 Chemical Products For Better Automotive Maintenance

Letters—

PSM Wins Safety Award Again

Congratulations!

It is a real pleasure for me to inform you that your organization has been voted the National Safety Council's Public Interest Award for 1953.

We here at the Council have been well aware of all you have been doing for safety, and we are delighted that the judges agreed.

NED H. DEARBORN, PRESIDENT
National Safety Council

Thank you, Mr. Dearborn. We are proud of having won this award for the third consecutive year.

How to Make a Garden Spurt

I put a hot-water pipe beside the cold-water pipe which runs to the outside of my house, for use in the garden. Now, each spring, in place of watering the seeds with

cold water, I use warm, and our garden is regularly two weeks ahead of the neighbors'.

F. W. BEEKER, Whitehorse, YT, Can.

Short History of Selden's Car

Actually, the oldest car painted by C. P. Hornung [March, p. 107] is the 1895 Duryea. The 1877 Selden was really not built until after 1900.

In 1876, George Selden saw an internal-combustion engine built by George Brayton. Selden later built an engine of the same

Copyrighted material

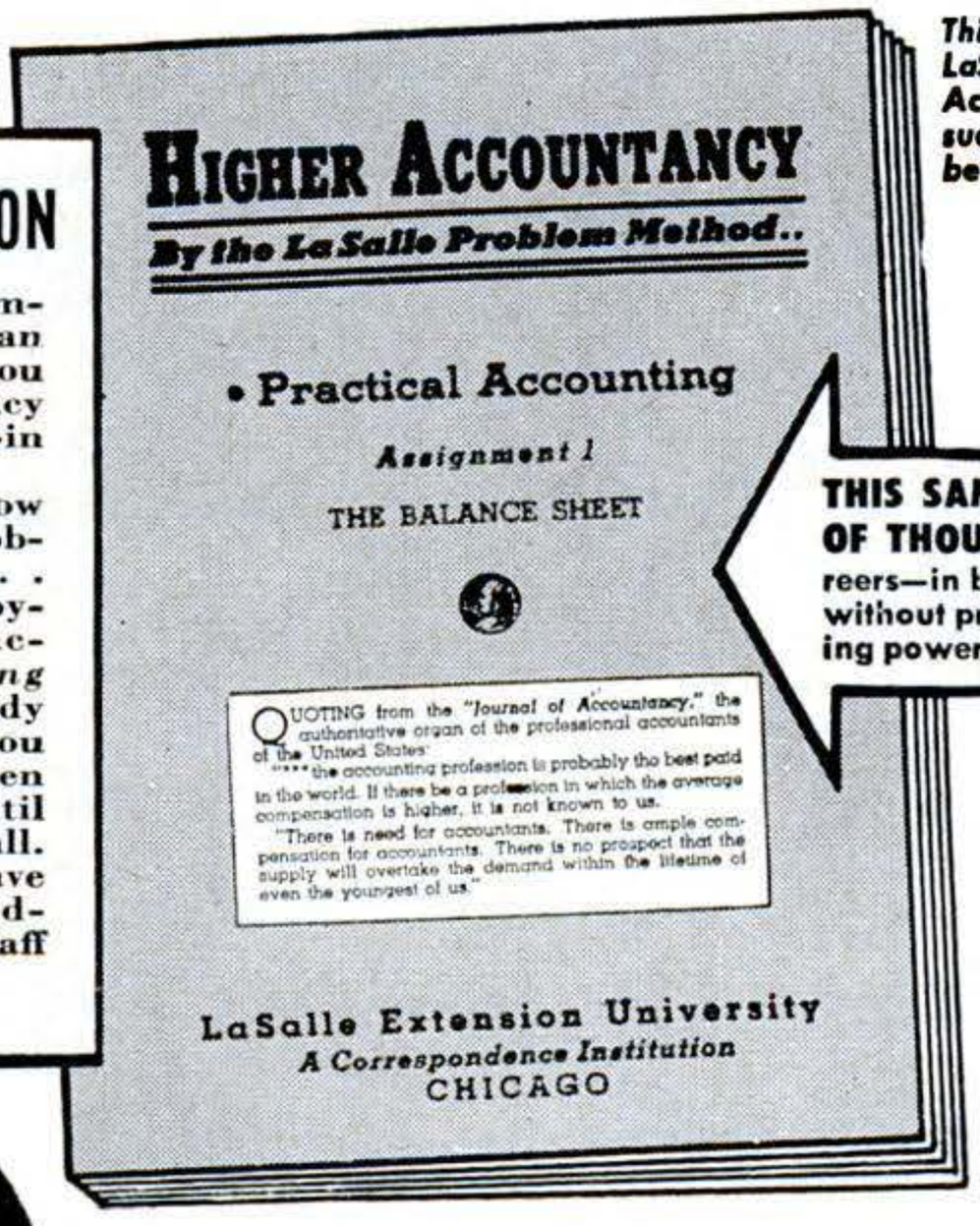
This *FREE SAMPLE LESSON* will prove you can become an expert BOOKKEEPER . . . ACCOUNTANT OR C.P.A.

This well-paid LaSalle-trained Accountant's success could be yours.

FREE SAMPLE LESSON

We offer you this free sample lesson so that you can *prove to yourself* that you CAN master Accountancy—quickly, thoroughly—in spare time at home.

You will see exactly how LaSalle's famous "Problem Method" works . . . how you are led step-by-step through actual accounting work—*learning by doing* and not by study of theory alone. First you tackle easy problems, then more difficult ones—until soon you master them all. And at every step you have the close personal guidance of LaSalle's large staff of C.P.A. instructors.



THIS SAME LESSON HAS STARTED HUNDREDS OF THOUSANDS toward well-paid accounting careers—in business, government, and as C.P.A.'s. Even without previous knowledge, progress is rapid—earning power climbs fast. This sample lesson shows why.

Nearly 10% of all C.P.A.'s in the U.S. have been trained by the LaSalle Problem Method

IF you have been envying the high incomes and good jobs enjoyed by thousands of men and women Accountants today . . . incomes ranging from $4,000 to $10,000 and more per year . . . why not launch such a career for yourself?

Do you doubt that you can?

Then let us send you—without cost or obligation—the same Lesson Number One with which LaSalle has started several hundred thousand men and women toward successful accounting careers. We want you to see for yourself how this remarkable method, originated by LaSalle, makes Accountancy simple, interesting, practical, and certain . . . how it leads you step-by-step to a complete mastery of Accounting—and on up to the coveted degree of Certified Public Accountant if you so aspire.

It doesn't matter whether you've had previous bookkeeping experience, or whether you don't know a debit from a credit. Whether you wish to qualify as an expert bookkeeper, advanced accountant, cost accountant, auditor, government accountant, income tax specialist, or public accountant . . . you'll find in LaSalle's Problem Method the exact plan to prepare you rapidly and inexpensively—in spare hours at home—without losing a day from your present job.

So right now, today . . . if you are an adult, employed, and earnestly ambitious for rapid advancement in this highest-paying of all professions . . . send your name and address on the coupon below. We'll send the free sample lesson—plus our 48-page book outlining today's career opportunities and how you can qualify for them. A coupon like this has started many thousands toward greater success. It can do the same for you. Mail it today!

GOOD-PAY JOBS IN 5 BIG FIELDS

If you were an expert accountant right now, chances are you would find yourself among the highest-paid of all professional men and women. Surveys show that accountants earn more than those in other major professions.

There are five big fields of opportunity open to Accountancy-trained men and women . . . opportunities that are wide open and highly inviting, offering maximum income and job security in good times or bad. And under LaSalle's "Problem Method" you can start earning while still learning—either in spare-time or full-time employment . . . or in business for yourself with no capital required.

Get the latest information by sending for our 48-page book, "Accountancy, the Profession That Pays" . . . plus free sample lesson. The coupon at right will bring both to you without cost or obligation. LaSalle Extension, 417 S. Dearborn St., Chicago 5, Ill.

Clip Coupon . . . Mail TODAY!

LaSalle Extension University . . . *A Correspondence Institution*

Dept. 683 H, 417 S. Dearborn Street, Chicago 5, Illinois

YES, I want to see how LaSalle's "Problem Method" works.. how I can qualify for high-pay Accountancy positions. Send Free Sample Lesson — also your 48-page book, "Accountancy, the Profession That Pays" ...all without cost or obligation.

Name. . . . . *Age*. . . . . .

Street Address. . . . . .

City, Zone & State. . . . . .

Present Position. . . . . .

Copyrighted material

AMAZING BARGAINS
DIRECT FROM IMPORTER-TO-YOU

Compare prices! Compare fine Thoresen quality! Quantities limited. Order now for 5 day home trial. NOTE: We don't kid you. All prices INCLUDE tax. Send price shown for fully prepaid delivery or order COD plus postage. Money back if not satisfied!

THORESEN'S, 352 Fourth Ave., Dept. 7-F-, New York 10, N. Y.

7 x 35 mm

34.50

TAX PAID

Only 5 x 6 inches! 375 Ft. Field at 1000 yds. Achromatic Coated Lenses! Light Weight! CENTER focus. Wonder value! Remember! **34.50 INCLUDES** tax! Pigskin Case. **ORDER BY NO. 170.**

7 X 50 mm 29.50 TAX PAID

Same high quality as our 7 x 35's. Has all above features, including CENTER focusing. Handsome pigskin case. Needle-sharp viewing even at night. Our Very **BEST** Value. **NO. 147,** tax paid.....**29.50**

3 Turret

Microscope

100X 200X 300X 9.44 NO TAX

Imagine—triple revolving turrets . . . 300, 200 or 100 power focusing. Finely ground, polished Achromatic Lenses . . . **ALL METAL** construction . . . Precision-tooled threadings. Ideal for lab, school or hobby use. Sturdy wooden case and dust-proof cover included! This offer may not be repeated so order **NOW** at this bargain price of **9.44. ORDER BY NO. 198.**

Enjoy BASEBALL, Racing, Movies, TV, Nature, Plays the SPEKTO-SCOPES Way!

NOW! 1.98 FTI

MADE IN GERMANY

Western Germany's famed binocular-spectacles are worn just like ordinary eyeglasses - - they give **MAGNIFIED VIEWING** - - hour after hour - - without fatigue! Greater range than many expensive opera & field glasses and far greater field of view than some selling for many times more! **INDIVIDUAL** eye focusing - - clear, sharp viewing whether at a ball game, a movie or sitting beside your TV set! Sparkling Ebony design - - weigh only 1 oz! Germany's need for dollars makes the special low price possible - - **1.98** tax & postpaid, a saving of $8.00 or more. Order **TODAY!**

No. 90....SPEKTOSCOPES....1.98 tax paid

CLOSE-UP VIEWS ALL DAY —NO STRAIN

THORESEN'S, Dept. 7-F

352 FOURTH AVE. NEW YORK 10, N. Y.

type. In 1879, he filed with the Patent Office the drawings of the vehicle known as the 1877 Selden. By making modifications, Selden kept the patent pending until 1895, when it was approved. He then made an agreement whereby the Electric Vehicle Company controlled the patent in return for a royalty to be paid to Selden. The big stockholders of the company formed the Association of Licensed Automobile Manufacturers in 1903 to license other manufacturers in return for a royalty on each car made.

When Henry Ford refused to pay royalties, the ALAM started legal proceedings against his company. To show that Selden's design was practical, the Electric Vehicle Company built two vehicles patterned after the patent drawings and powered by Brayton-type engines.

In 1911, the U. S. Appellate Court ruled that the patent was valid only when the Brayton engine was used. The ALAM dissolved shortly afterward.

TERRY GRANT, Belton, Tex.

Bouquet from a Woman Reader

I want to take the opportunity to tell you that POPULAR SCIENCE MONTHLY is a must in our budget. You designate it as a man's magazine, but I must say that I find a

wealth of useful material for me in it that can't be found in the so-called "women's magazines."

MRS. LEONARD W. CALVERT, Ottawa Lake, Mich.

They Already Make It

A contributor to your "I'd like to See Them Make" feature in February [p. 177] suggested "a safety razor with a magnet built into the end of the handle so dropped blades could be picked up easily and safely." I beg to draw your attention and his to the fact that such a safety razor has been made

Copyrighted material

INVENTORS

Learn how to protect your invention. The U. S. Patent Laws provide that any new and useful art, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof, may be patented if the act of invention is involved. Therefore, every inventor with a valuable invention should take advantage of the Patent Laws and proceed for patent protection in order to safeguard his rights.

A patent gives the inventor the exclusive right to prevent others from making, using, or selling the invention claimed in the patent for a period of seventeen years.

The Patent Laws were enacted for the benefit of the inventor to give him protection for the features of his invention which are patentable. These features must be properly and concisely set forth and claimed in a formal application for patent, in order to comply with the requirements of the Patent Laws. For that reason, unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and are prepared to serve you in the handling of your patent matters.

A specially prepared booklet entitled "Patent Guide for the Inventor", containing detailed information with respect to patent protection and procedure, together with a "Record of Invention" form will be promptly forwarded to you without obligation upon request.

CLARENCE A. O'BRIEN & HARVEY JACOBSON

Registered Patent Attorneys

42-F DISTRICT NATIONAL BUILDING

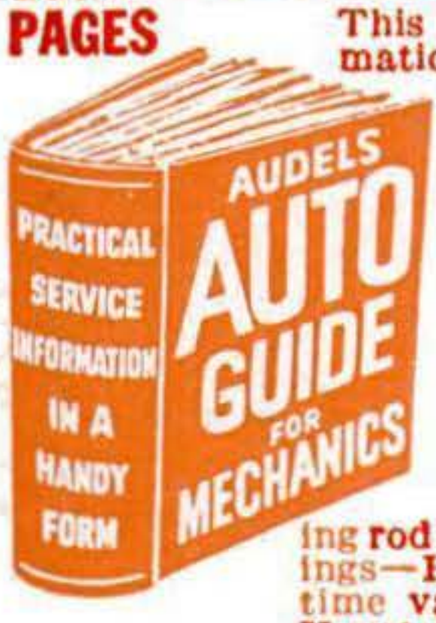
WASHINGTON 5, D. C.

Copyrighted material

WHAT ALL AUTO MECHANICS WANT TO KNOW

1664 PAGES

This Big Practical Book gives full information with working diagrams covering the principles, construction, ignition, service and repair of modern cars, trucks and buses.



Diesel Engines, Hydramatic & Fluid Drives Fully Explained.

A complete Guide of 1800 pages, with over 1500 illustrations showing inside views of working parts, with instructions for service jobs.

IT PAYS TO KNOW

How to fit pistons—How to locate engine knocks. How to fit connecting rod bearings—How to service main bearings—How to recondition valves—How to time valves—How to adjust fan belts—How to adjust carburetors and chokes. How to rebuild a clutch—How to service automatic transmissions—How to service brakes—How to adjust steering gear—How to cope with ignition troubles—How to service distributors—How to time ignition—How to "tune up" an engine.

$4 COMPLETE • PAY $1 A MO.
TO GET THIS ASSISTANCE FOR YOURSELF SIMPLY FILL IN AND MAIL COUPON TODAY.

Step up your own skill with the facts and figures of your trade. Audels Mechanics Guides contain Practical Inside Trade Information in a Handy Form. Fully illustrated and Easy to Understand. Highly Endorsed. Check the book you want for 7 DAYS FREE EXAMINATION. Send No Money. Nothing to pay postman.

MAIL ORDER

AUDEL, Publishers, 49 W. 23 St., NEW YORK 10, N. Y.

Please send me postpaid for FREE EXAMINATION books marked (x) below. If I decide to keep them I agree to mail $1 in 7 Days on each book or set ordered and further mail $1 monthly on each book or set until I have paid price, otherwise I will return them.

- ☐ AUTOMOBILE MECHANICS GUIDE, $4
- ☐ TRUCK & TRACTOR GUIDE, 1299 Pages . . . 4
- ☐ DIESEL ENGINE MANUAL, 575 Pages 2
- ☐ MACHINISTS HANDY BOOK, 1650 Pages . . . 4
- ☐ WELDERS GUIDE, 400 Pages 1
- ☐ BLUE PRINT READING, 416 Pages 2
- ☐ MATHEMATICS & CALCULATIONS, 700 Pages. 2
- ☐ SHEET METAL PATTERN LAYOUTS, 1100 Pages 4
- ☐ SHEET METAL WORKERS HANDY BOOK, 388 Pgs. 1
- ☐ MECHANICAL DRAWING GUIDE, 160 Pages . . 1
- ☐ MECHANICAL DRAWING & DESIGN, 480 Pages 2
- ☐ AIRCRAFT WORKER, 240 Pages 1
- ☐ TELEVISION SERVICE MANUAL, 384 Pages . . 2
- ☐ RADIOMANS GUIDE, 914 Pages 4
- ☐ ELECTRONIC DEVICES, 216 Pages 2
- ☐ ELECTRIC MOTOR GUIDE, 1000 Pages 4
- ☐ ELECTRIC WIRING DIAGRAMS, 272 Pages . . 1
- ☐ ELECTRICIANS EXAMINATIONS, 250 Pages. . 1
- ☐ ELECTRIC POWER CALCULATIONS, 425 Pages. 2
- ☐ HANDY BOOK OF ELECTRICITY, 1440 Pages. . 4
- ☐ ELECTRIC DICTIONARY, 9000 Terms 2
- ☐ ELECTRIC LIBRARY, 7000 Pages (12 Book Set) 18
- ☐ MARINE ENGINEERS HANDY BOOK, 1258 Pgs. 4
- ☐ SHIPFITTERS HANDY BOOK, 250 Pages . . . 1
- ☐ REFRIGERATION & Air Conditioning, 1280 Pgs. 4
- ☐ MILLWRIGHTS & MECHANICS GUIDE, 1200 Pgs. 4
- ☐ POWER PLANT ENGINEERS GUIDE, 1500 Pages 4
- ☐ ENGINEERS & FIREMANS EXAMS, 525 Pages . 1
- ☐ PUMPS, Hydraulics & Air Compressors, 1658 Pgs. 4
- ☐ ENGINEERS LIBRARY (3 Book Set) 9
- ☐ MECHANICAL DICTIONARY, 950 Pages 4
- ☐ GARDENERS & GROWERS GUIDES (4 Book Set) 6
- ☐ CARPENTERS & BUILDERS GUIDES (4 Book Set) 6
- ☐ PLUMBERS & Steamfitters Guides (4 Book Set) 6
- ☐ MASONS AND BUILDERS GUIDES (4 Book Set) 6
- ☐ PAINTERS & DECORATORS MANUAL, 450 Pgs. 2
- ☐ HOUSE HEATING GUIDE, 1000 Pages 4
- ☐ OIL BURNER GUIDE, 384 Pages 1

Check NOW!

You Can Look Over Any Guide In Your Own Home — Start the Easy Payments If Satisfied

MAIL THIS TODAY

Name _____
Address _____
Occupation _____
Employed by _____ S6

by Messrs. James Neill & Co., Ltd., Sheffield, England. The one in my possession was purchased in 1938 and in use since then.

C. G. Catchatoor, Calcutta, India

Novel Trap for Speeders

How about an electric-eye detectograph for catching speeders? I visualize it as an electric-eye device that would control the shutter of a camera, set at an angle beside the highway so that it could get a good view of passing license plates. This apparatus would be synchronized with mechanisms registering speed, time and date. Perhaps it should also have an infrared device for night photography.

Then the law-enforcement officers could make the rounds of the cameras every 24 hours, picking up the previous day's film and

sending out summonses on the basis of its evidence. The system might also help catch criminals at large on the highways.

Caspar H. Smith, Tacoma, Wash.

Let the Sun Boil Alcohol!

In "Sun Furnace Goes to Work" [March, p. 129], you stated that if heat engines could run efficiently at lower temperatures than conventional types, one might be able to utilize solar power. Why not use a liquid of a lower boiling point, such as alcohol? With a closed circulating system, it should not prove too expensive.

Alan C. Davidson, Brooklyn, N. Y.

Seems like an idea worth trying.

Gus Gets His Wires Crossed

Oh, no! You done him wrong.

On page 260 of your April issue, Gus skins the insulation off a wire to wind an electromagnet.

The Gus I have so long read about with

Copyrighted material

INVENTORS

If you believe that you have an invention, you should find out how to protect it. The first step is to have a search made of the prior pertinent U. S. patents. If a report on this search indicates that the invention appears patentable you can apply for a patent, and the specifications and claims should be prepared.

The firm of McMorrow, Berman & Davidson, with offices in Washington, D. C., is qualified to take the necessary steps for you. We can make a preliminary search on your invention, advise you whether we think it can be patented, and prepare your application for patent.

Unless you are fully familiar with the U. S. Patent Laws, we recommend that you engage the services of a Registered Patent Attorney to protect your interests. The patent laws are *your* laws. A patent gives you the right to prevent others from making, using or selling the invention claimed in your patent for a period of 17 years.

Use these patent laws for your protection. Investigate whether your invention can be patented. If you have what you believe to be an invention, we suggest that you have this firm make a search for you.

Send for a copy of our Patent Booklet entitled "How To Protect Your Invention," containing information about patent protection and patent procedure. Along with this we will also send you an "Invention Record" form, for your use in writing down and sketching details of your invention. We will mail them promptly. No obligation. They are yours for the asking.

McMORROW, BERMAN & DAVIDSON

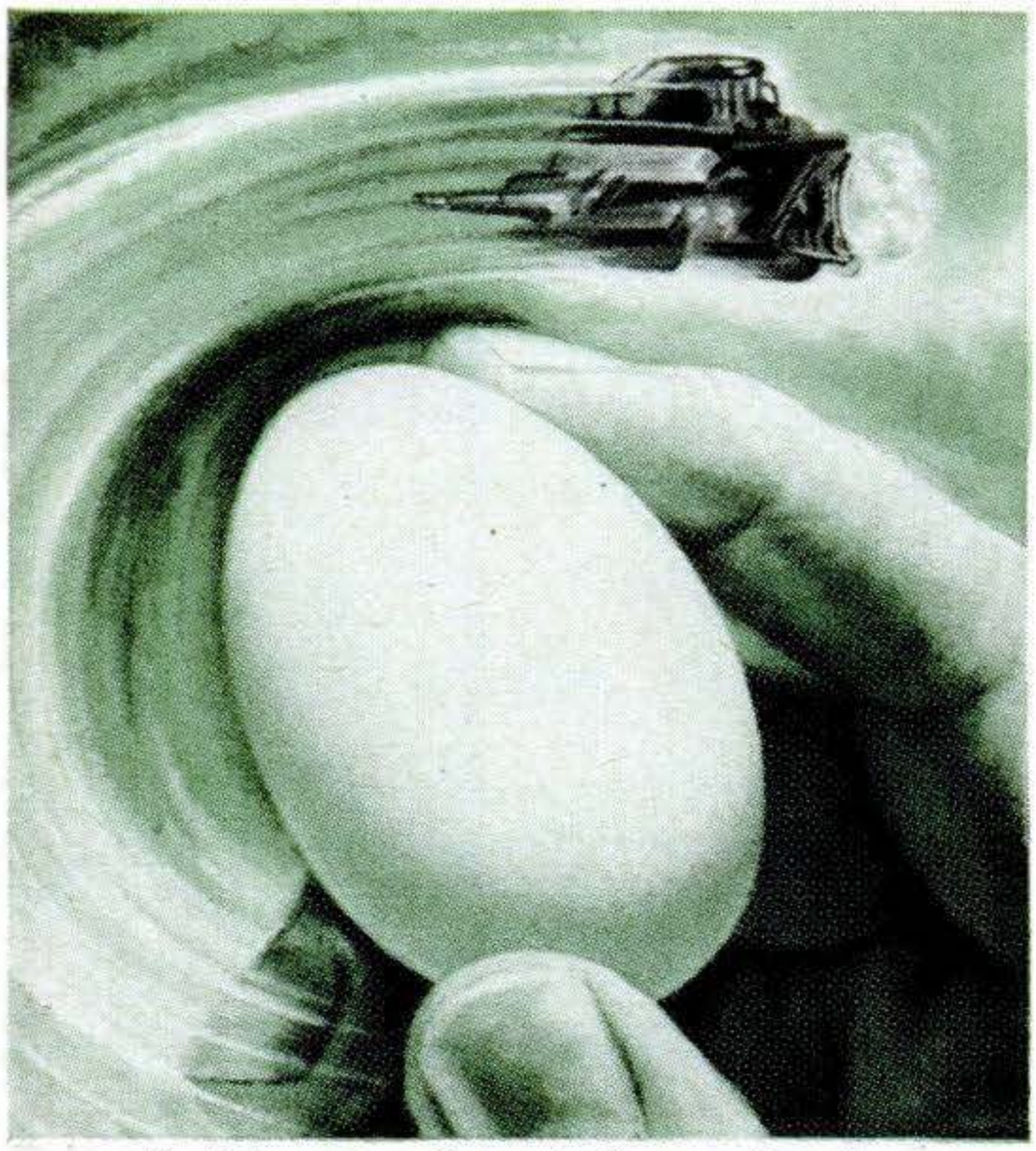
Registered Patent Attorneys

PATENTS • COPYRIGHTS • PATENTS

1422 VICTOR BUILDING, WASHINGTON 1, D. C.

Copyrighted material

Your engine's life depends on a film of oil 14 times thinner than an eggshell!



The high-speed moving parts of your car's engine work with clearances as thin as 1/1000th of an inch!

Use high-quality Quaker State for the film that assures least engine wear

A SUPER FILM! . . . that provides perfect lubrication for your car's engine. Quaker State Motor Oil is rich, stable, enduring . . . every drop is refined from 100% Pure Pennsylvania Grade Crude Oil. Keeps new engines new longer, helps any engine run better. Quaker State is the product of a half century of specialization in automobile lubrication —made for today's modern engines. Economical too—every quart goes farther!

ASK FOR . . .

Quaker State Motor Oil is made to suit the requirements of all makes of cars and for every type of service. Ask your dealer.

QUAKER STATE OIL REFINING CORPORATION, OIL CITY, PA.

Member Pennsylvania Grade Crude Oil Association

so much pleasure and admiration knows it would work *with* insulation but not without.

Give us more Gus Wilson stories but I wish you'd check a little closer with the "book mechanic."

LEROY R. SHEARER, Los Angeles, Calif.

How He Killed Curiosity

Being able to work alone in my hobby shop was a problem, because the kids and my wife were always bothering me. So I bought some snappy pictures and hung them all over the walls of the shop. Now the wife refuses to come near the shop and

keeps the kids away from it, too. At last I have complete satisfaction.

JAMES J. KAYS, Modesto, Calif.

The Radiated-Power Race

In your article "Man's Tallest Tower to Broadcast TV" [Feb., p. 166], you stated that the station [Oklahoma City's 316,000-watt KWTV] would be 50,000 watts stronger than any other. I would like to inform "yawl" that WABT in Birmingham, Ala., has been operating on 316,000 watts for many months.

LLOYD M. MOORE, Hartselle, Ala.

. . . WFBG-TV, Channel 10, Altoona, has 316,000 watts' power.

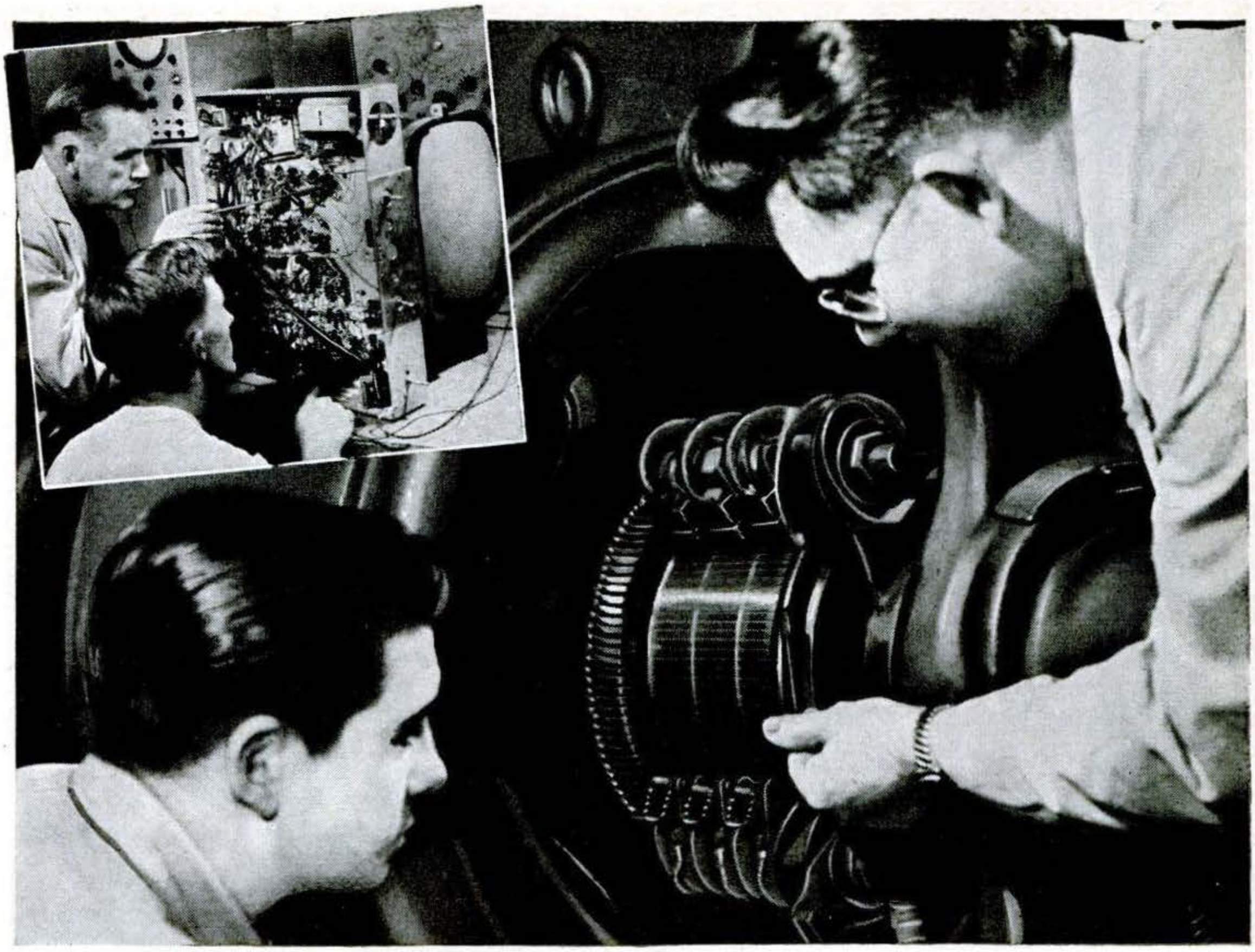
JOHN W. REIFSNYDER, Millheim, Pa.

. . . WHAS-TV, Channel 11, Louisville, operates on 316,000 watts at the present time.

CHARLES PEEVEY, JR., New Albany, Ind.

We were behind the times. There are now seven TV stations operating on 316,000 watts effective radiated power, and seven others have been authorized to go that high but have not as yet. A UHF station—KTVU, Channel 36, Stockton, Calif.—is authorized

Copyrighted material



TRAIN FOR A FUTURE IN

Electricity or Television-Radio

IT'S THE ACTUAL SHOP TRAINING AT COYNE THAT MAKES THE DIFFERENCE!

Prepare quickly at Coyne for a career with a future!

Trained men are vitally needed now whether 17 or up to 45. Get a better rating, if drafted—an essential job in industry, if not in A FIELD THAT OFFERS A REAL FUTURE.

APPROVED FOR VETERANS

WE TRAIN YOU IN CHICAGO

Learn the easier, practical way at *Coyne*, on real, full size equipment. No advanced education or previous experience needed. You learn *better* the *Coyne* way.

Train in the shops of Coyne—where thousands of successful men have trained for over 55 years—*Coyne is the largest, oldest, best equipped school of its kind*—established in Chicago in 1899.

FINANCE PLAN Enroll now. You may pay most of tuition later. We have a *special plan for men of draft age.*

CLIP COUPON NOW for big new illustrated *Coyne* book. No obligation; no salesman will call. Get vital facts now!

B.W. COOKE President **COYNE** FOUNDED 1899
ELECTRICAL SCHOOL

A TECHNICAL TRADE INSTITUTE CHARTERED NOT FOR PROFIT
500 S. PAULINA, CHICAGO, Dept. A4-73H
ELECTRICITY ★ RADIO ★ TELEVISION ★ REFRIGERATION ★ ELECTRONICS

Mail Coupon Today for

BIG FREE BOOK

Check whether interested in ELECTRICITY or TELEVISION-RADIO or both.

B. W. COOKE, President
COYNE ELECTRICAL SCHOOL
500 S. Paulina St., Chicago 12, Ill., Dept. A4-73H

Send BIG FREE book and details of your training offer. This does not obligate me and no salesman will call. I am interested in:

☐ ELECTRICITY ☐ TELEVISION-RADIO

Name.....

Address.....

City..... State.....

Copyrighted material

to use 525,000 watts but is now using only 151,000.

A Case of Exploding Shingles

On page 233 of your February issue, Lucien Greif suggested using an asbestos-cement shingle to protect wood from a torch flame. But such shingles explode violently when subjected to extreme heat. I know, because we had to stop the children from throwing shingle scraps into the barbecue fire, for fear of flying pieces.

JOHN WEBSTER, Islington, Ont.

The scraps were probably water-soaked. In a sufficiently hot fire, trapped moisture turns to steam too fast to escape, and so bursts the shingle. A dry asbestos-cement shingle may safely be used.

New Use for an Oven Door

The good old kitchen stove came to my rescue when I wanted to fold a piece of sheet metal in a hurry and didn't have a hand brake, folder or bench vise with angles around. I used the oven door, holding it shut on the metal with one hand, then lifting the rest of the metal to the desired angle with the other hand. Presto! I had a perfectly straight and kinkless fold. I even used the door to flatten the fold, just as I would do with a hand brake.

JOHN SAHULKA, Cicero, Ill.

Where to Find Lead Paste

In your March issue [p. 250], you featured a shop tip to use white or red lead in a tube for lubricating lathe points.

The idea is excellent *if* you could obtain either white or red lead paste in tubes. Local paint and artist's supply stores don't carry them, but nearly all have zinc paste in tube form. I am beginning to suspect your Mr. Joseph Tracy is using *that*. Perhaps it will work. I don't know, but it would be hard to convince any veteran lathe hand who has put his confidence in lead paste for the job, be it either white or red.

RAY HAMPTON, Fullerton, Calif.

Ask one of those art-supply stores for Grumbacher's "flake white" in tubes. This is a basic lead carbonate (white lead) in pure linseed oil, with a small percentage of aluminum stearate. It makes a good center lubricant for lathe work.

New Greaseless Way To Keep Your Hair Neat All Day

Vitalis Hair Tonic with V-7 makes even dry, unruly hair easy to manage.

Keeps hair neat with V-7, new *greaseless* grooming discovery that outdates messy oils. Never a gummy film or "oil-slick" look!

Prevents Dryness. What's more, new Vitalis maintains your hair's *natural* moisture balance better than any other leading tonic. Try new Vitalis with V-7—you'll like it.

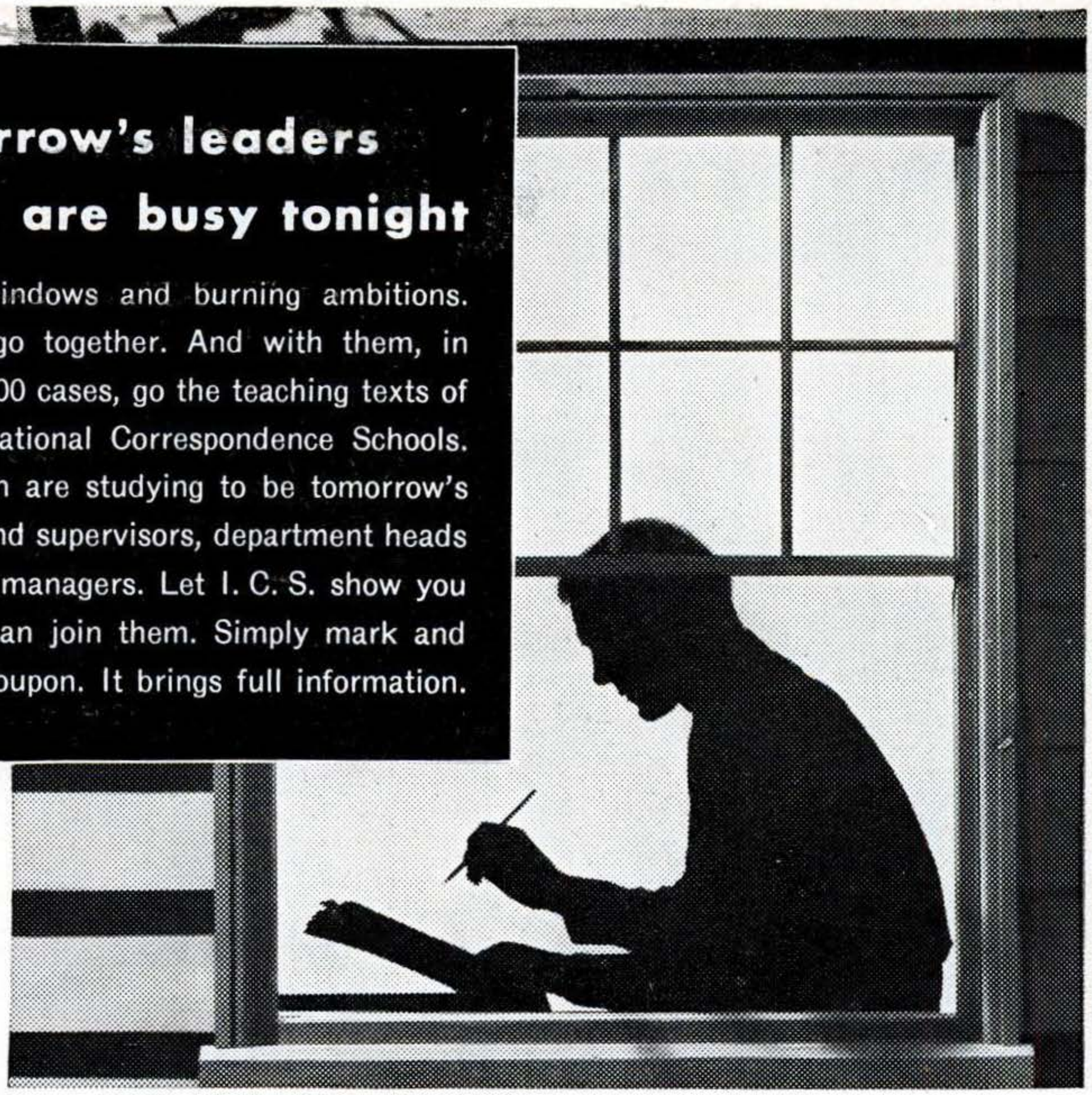
VITALIS® with V-7

PRODUCT OF BRISTOL-MYERS

Copyrighted material

Tomorrow's leaders are busy tonight

Lighted windows and burning ambitions. The two go together. And with them, in over 100,000 cases, go the teaching texts of the International Correspondence Schools. These men are studying to be tomorrow's foremen and supervisors, department heads and office managers. Let I. C. S. show you how you can join them. Simply mark and mail the coupon. It brings full information.



For Real Job Security — Get I. C. S. Training! **I. C. S., Scranton 9, Penna.**

INTERNATIONAL CORRESPONDENCE SCHOOLS ICS

BOX 7681-N, SCRANTON 9, PENNA. (Partial list of 277 courses)

Without cost or obligation, send me "HOW to SUCCEED" and the opportunity booklet about the field BEFORE which I have marked X:

ARCHITECTURE and BUILDING CONSTRUCTION
- ☐ Air Conditioning—Refrig.
- ☐ Architecture
- ☐ Building Contractor
- ☐ Building Maintenance
- ☐ Carpenter and Mill Work
- ☐ Estimating
- ☐ Heating
- ☐ Painting Contractor
- ☐ Plumbing
- ☐ Reading Arch. Blueprints
- ☐ Steamfitting

ART
- ☐ Cartooning
- ☐ Commercial Art
- ☐ Fashion Illustrating
- ☐ Magazine Illustrating
- ☐ Show Card and Sign Lettering
- ☐ Sketching and Painting

AUTOMOTIVE
- ☐ Auto Body Rebuilding
- ☐ Auto Elec. Technician
- ☐ Auto-Engine Tune Up
- ☐ Automobile Mechanic

AVIATION
- ☐ Aeronautical Engineering Jr.
- ☐ Aircraft & Engine Mechanic

BUSINESS
- ☐ Advertising
- ☐ Bookkeeping and Accounting
- ☐ Business Administration
- ☐ Business Correspondence
- ☐ Certified Public Accounting
- ☐ Creative Salesmanship
- ☐ Federal Tax
- ☐ Letter-writing Improvement
- ☐ Managing Small Business
- ☐ Office Management
- ☐ Retail Business Management
- ☐ Sales Management
- ☐ Stenographic-Secretarial
- ☐ Traffic Management

CHEMISTRY
- ☐ Analytical Chemistry
- ☐ Chemical Engineering
- ☐ Chem. Lab. Technician
- ☐ General Chemistry
- ☐ Natural Gas Prod. & Trans.
- ☐ Petroleum Engineering
- ☐ Plastics
- ☐ Pulp and Paper Making

CIVIL, STRUCTURAL ENGINEERING
- ☐ Civil Engineering
- ☐ Construction Engineering
- ☐ Highway Engineering
- ☐ Reading Struct. Blueprints
- ☐ Sanitary Engineering
- ☐ Structural Engineering
- ☐ Surveying and Mapping

DRAFTING
- ☐ Aircraft Drafting
- ☐ Architectural Drafting
- ☐ Electrical Drafting
- ☐ Mechanical Drafting
- ☐ Mine Surveying and Mapping
- ☐ Ship Drafting
- ☐ Structural Drafting

ELECTRICAL
- ☐ Electrical Engineering
- ☐ Electrical Maintenance
- ☐ Electrician ☐ Contracting
- ☐ Lineman

HIGH SCHOOL
- ☐ Commercial
- ☐ Good English
- ☐ High School Subjects
- ☐ Mathematics

LEADERSHIP
- ☐ Foremanship
- ☐ Industrial Supervision
- ☐ Leadership and Organization
- ☐ Personnel-Labor Relations

MECHANICAL AND SHOP
- ☐ Gas—Electric Welding
- ☐ Heat Treatment ☐ Metallurgy
- ☐ Industrial Engineering
- ☐ Industrial Instrumentation
- ☐ Industrial Supervision
- ☐ Machine Design-Drafting
- ☐ Machine Shop Inspection
- ☐ Machine Shop Practice
- ☐ Mechanical Engineering
- ☐ Quality Control
- ☐ Reading Shop Blueprints
- ☐ Refrigeration
- ☐ Sheet Metal Worker
- ☐ Tool Design ☐ Toolmaking

RADIO, TELEVISION
- ☐ Electronics
- ☐ Practical Radio—TV Eng'r'ng
- ☐ Radio and TV Servicing
- ☐ Radio Operating
- ☐ Television—Technician

RAILROAD
- ☐ Air Brakes ☐ Car Inspector
- ☐ Diesel Locomotive
- ☐ Locomotive Engineer
- ☐ Section Foreman

STEAM AND DIESEL POWER
- ☐ Combustion Engineering
- ☐ Diesel—Elec. ☐ Diesel Eng's
- ☐ Electric Light and Power
- ☐ Stationary Fireman
- ☐ Stationary Steam Engineering

TEXTILE
- ☐ Carding and Spinning
- ☐ Cotton, Rayon, Woolen Mfg.
- ☐ Finishing and Dyeing
- ☐ Loom Fixing
- ☐ Textile Designing
- ☐ Textile Eng'r'g ☐ Throwing
- ☐ Warping and Weaving

MISCELLANEOUS
- ☐ Domestic Refrigeration
- ☐ Marine Engineering
- ☐ Ocean Navigation
- ☐ Shipfitting
- ☐ Short Story Writing
- ☐ Telephony

Name_____ Age_____ Home Address_____

City_____ Zone_____ State_____ Working Hours_____ A.M. to P.M._____

Occupation_____

Canadian residents send coupon to International Correspondence Schools, Canadian, Ltd., Montreal, Canada. . . . Special tuition rates to members of the U. S. Armed Forces.

Copyrighted material

Enjoy Carefree Summer Driving!

PREVENT ENGINE DAMAGE from Overheating!

Dirty, clogged cooling systems cause overheating and may result in severe damage to your engine.

SOLDER SEAL

Chemical TOOLS

keep cooling systems clean—in top condition

★ **SUPER SOLVENT** breaks down rust, dissolves scale and sludge, removes oily, greasy deposits . . . so that all are flushed out easily and thoroughly.

★ **WATER PUMP LUBRICANT and Rust Inhibitor** lubricates water pump bearings and seals . . . *and* prevents rust and corrosion. Stops chattering and squeaks in water pumps. Should be used after cleaning with Super Solvent.

★ **LIQUID RADIATOR REPAIR** is a quick, sure repair for leaks in cooling systems. Easy to use . . . it circulates throughout the system to every point of leakage and goes right to work.

QUALITY SOLDER SEAL PRODUCTS

AT YOUR SERVICE STATION OR GARAGE

★ **LIQUID WRENCH** is a super penetrant that loosens rust and corrosion almost instantly. Loosens rusted nuts, bolts and parts. Harmless to metal. Cleans guns, rods and reels, typewriters, etc.

AT SERVICE STATIONS, GARAGES, HARDWARE STORES . . . EVERYWHERE

JUST SPRAY IT ON!

★ **ACRA-SEAL PLASTIC SPRAY.** A colorless, transparent chemical product that produces a clear, strong, flexible, waterproof coating on metal, wood, rubber, paper or plastic. Moisture-proofs, rust-proofs, insulates. For ignition systems, chrome parts, radio and TV sets.

Manufactured by 2059

RADIATOR SPECIALTY CO.
1700 Dowd Road • Charlotte, N.C.

CAVITEX

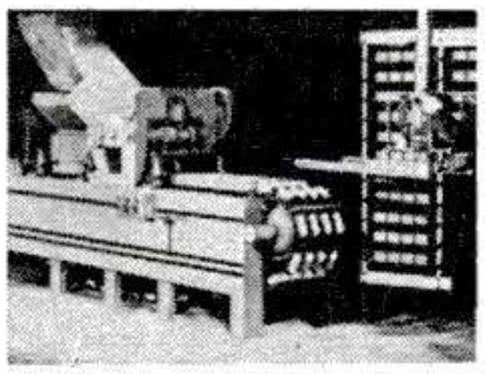
Superfine Masonry

Manufacturing Rights Now Available in 427 Territories

Cavitex offers building owners the ultimate in masonry at sensationally low costs. Designed in line with today's architecture. Long and low. Large color range. Modular in all dimensions. Strong—safe—enduring. Suited to all types of wall construction—cavity, partition, veneer.

As a local manufacturing opportunity, Cavitex has tremendous potentials. Local materials are processed by local labor for local consumption. Vast economies effected. That's why Cavitex has price-appeal to buyers and profit-appeal to producers. Hundreds of territories are open.

Cavitex manufacturers operate in franchise-protected territories and with exclusive privileges. Extensive sponsor cooperation. Basic machinery available on lease. Write or wire for book "Opportunity, Unlimited" and tentative reservation of territory.



W.E. DUNN MFG. CO.
410 West 24th Street
Holland, Mich.

LOOK!

A MILLION THRILLS!
High Power
BINOCULARS
30 DAY FREE TRIAL
Finest Precision Optics
Money Back Guarantee
Easy Pay Plan
Free! Catalog & Book "How to Select Binoculars"
Dept. P86 43 E. Green Pasadena, Calif.
BUSHNELL *Binoculars*

SAVE MONEY
On 1,001 Home Repairs

Rush postcard for 7 DAY FREE TRIAL of amazing new book, "BASIC HOME CARPENTRY." Over 300 pages, more than 500 "how-to" pictures! SEND NO MONEY NOW! If more than delighted, remit only $2.95 plus postage—or return it and owe nothing! Dept. 806
WM. H. WISE & CO., Inc., 50 West 47 St., New York 36, N. Y.

more jobs than graduates

ENGINEERS ...enging opportunity! If you ...g interesting work in these fi... pay you to write Box D ... including a complete history ...r, ...ience and education.

Demand for our engineering graduates exceeds supply. *Effective placement!* Study in this world-famed college . . . established 1884. New term starts quarterly. *Approved for Korean Vets.*

Bach. Sc. degree in 27 months

Bachelor of Science in Mechanical, Civil, Electrical, Chemical, Aeronautical, Radio (Television), Administrative Engineering; Business Administration and Accounting. Also 36-weeks certificate courses in Surveying, Drafting, Secretarial Science. *Intensive program: technical fundamentals accented.*

Small classes: personalized instruction. For earnest, mature students whose time and budget require accelerated courses and *modest costs.* Preparatory courses.

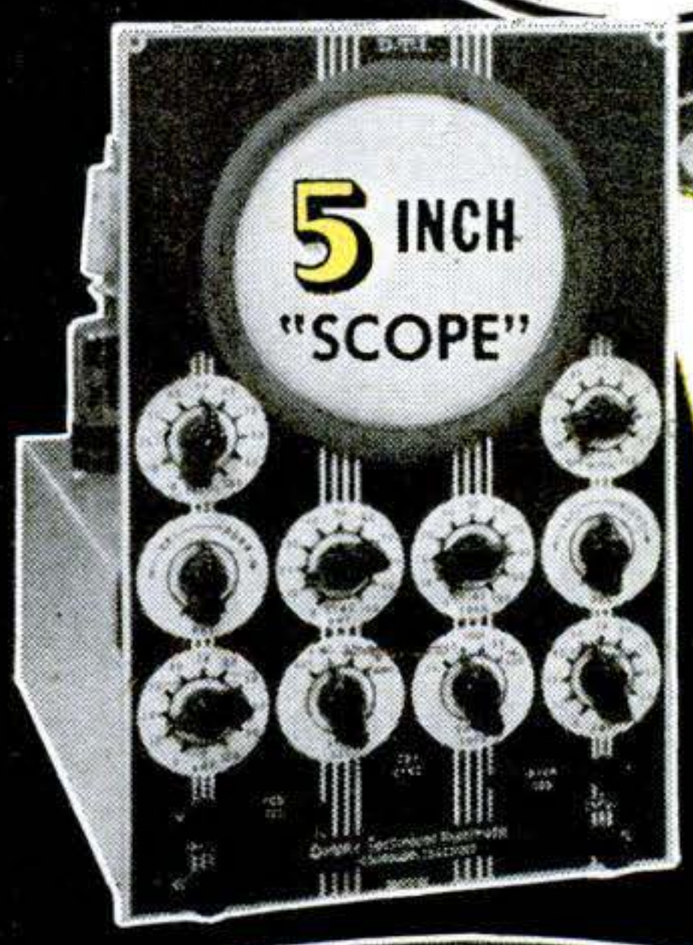
Beautiful campus in friendly college town. Well-equipped, new and modernized buildings and labs. Enter June, Sept., Jan., March. *Write Jean McCarthy, Director of Admissions, for Catalog and View Book*

TRI-STATE COLLEGE
564 College Avenue **Angola, Indiana**

Copyrighted material

Now! Work over 300 practical projects WITH THESE PARTS...

All Electronic Parts YOURS TO KEEP!



....TO HELP YOU LEARN

TELEVISION

RADIO-ELECTRONICS Now . . . at home in spare time you can get BOTH the very training and subsequent Employment Service you need to help you start earning real money in America's thrilling, multi-billion dollar opportunity field of Television-Radio-Electronics. Now that Television is coming to almost every community, here is a chance of a lifetime to prepare to cash in on one of Television's great expansions.

D.T.I.'s amazingly practical home method enables you to set up your own HOME LABORATORY. You get many Electronic parts which you mount on individual bases with spring clip connecters. Tops for experimenting! Add or remove parts in a jiffy. No wasted hours of soldering and unsoldering for each project. You spend *minimum* time to get *maximum* knowledge of important circuits that really work. In fact, you get exactly the same type of basic training equipment used in our Chicago training laboratory—one of the nation's finest.

Build and KEEP This VALUABLE TEST EQUIPMENT

Your home laboratory projects also include building and keeping a versatile 5 inch Oscilloscope and precision Jewel Bearing Multi-Meter. These quality commercial test instruments help you EARN WHILE YOU LEARN and will prove mighty valuable, should you later decide to start your own full time TV-Radio service business. You also build and keep a quality 21 inch TV SET.

D.T.I. Provides EVERYTHING YOU NEED to master TELEVISION

In addition to your home laboratory and easy-to-read lessons, you even use HOME MOVIES—a wonderfully effective and exclusive D.T.I. training advantage. You watch hidden actions . . . see electrons on the march. Important fundamentals . . . become "movie clear," helping you learn faster . . . easier . . . better.

Full time Residential training in D.T.I.'s great Chicago laboratories also available. MAIL COUPON TODAY for all facts. (If subject to Military Service, you'll especially welcome the information we have for you.)

HOME MOVIES

21 INCH

Build and keep this BIG DTI Engineered TV set—easily converted to U.H.F. (DTI offers another home training, but without the TV set.)

89 WAYS TO EARN MONEY

"ONE OF AMERICA'S FOREMOST TELEVISION TRAINING CENTERS"

DeVRY TECHNICAL INSTITUTE
AFFILIATED WITH
DeFOREST'S TRAINING, INC.
CHICAGO 41, ILLINOIS

MAIL COUPON TODAY!

DeVRY TECHNICAL INSTITUTE DEPT. PS-6-K
4141 BELMONT AVE., CHICAGO 41, ILL.

I would like your valuable information-packed publication showing how I can get started toward a good job or my own business in Television-Radio-Electronics.

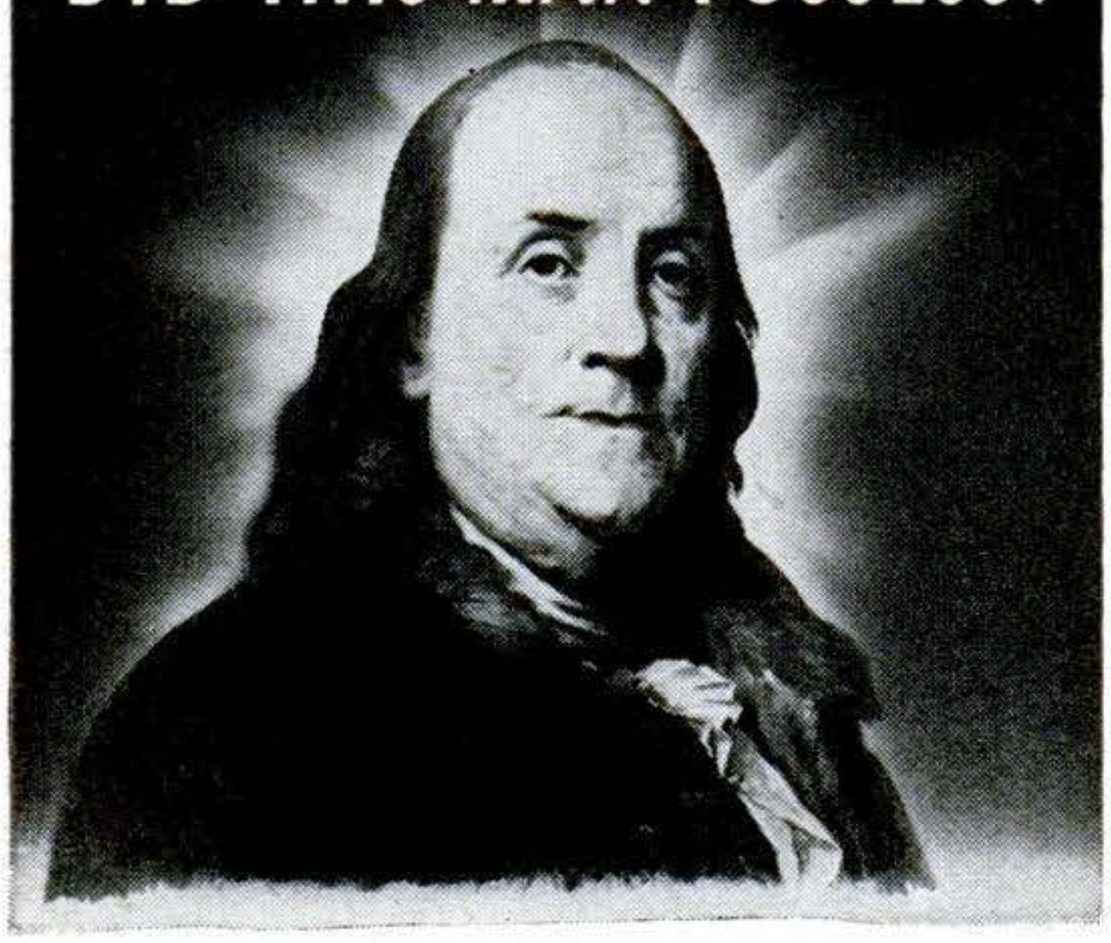
Name_____ Age_____

Street_____ Apt._____

City_____ Zone____ State_____

Copyrighted material

WHAT SECRET POWER DID THIS MAN POSSESS?



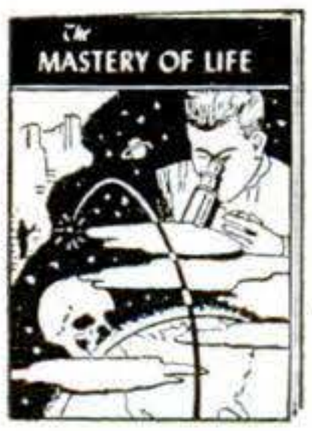
BENJAMIN FRANKLIN
(A Rosicrucian)

WHY was this man great? How does anyone —man or woman—achieve greatness? Is it not by mastery of the powers within ourselves?

Know the mysterious world within you! Attune yourself to the wisdom of the ages! Grasp the inner power of your mind! Learn the secrets of a full and peaceful life!

Benjamin Franklin—like many other learned and great men and women—was a Rosicrucian. The Rosicrucians (NOT a religious organization) first came to America in 1694. Today, headquarters of the Rosicrucians send over seven million pieces of mail annually to all parts of the world. Write for YOUR FREE COPY of "The Mastery of Life"—TODAY. No obligation. No salesmen. A non-profit organization. Address: Scribe F.F.J.

THIS BOOK FREE!



The ROSICRUCIANS
SAN JOSE • (AMORC) • CALIFORNIA

SEND THIS COUPON

Scribe F.F.J.
The ROSICRUCIANS (AMORC)
San Jose, California

Please send me the *free* book, *The Mastery of Life,* which explains how I may learn to use my faculties and powers of mind.

Name_____

Address_____

City_____

Ball-Bearing SPEED WHEELS

JUVENILE WHEELS (No bearing, solid tires)
5" . . . . . 45c 6" 65c
7" 75c
(Semi-pneumatic tire, ball bearing)
8x1.25 . . . $1.85 10x1.25 . . $2.20
8x1.75 . . . 1.95 10x1.75 . . 2.30
8x2 . . . . . 2.20 10x2 . . . . 2.65
12x1.75 . . . . . $3.45

INDUSTRIAL WHEELS
(Lug Base, Semi-Pneumatic tire)
6x2 SW . . . $3.45 10x2.00 . . $6.10
6x2.00 . . . 4.00 10x2.75 . . 5.15
8x2.00 . . . 5.20 10x2.75 Pneu. 6.90
8x2.50 . . . 5.40 12x2.00 . . 6.90
16x4.00 . . 15.15 12x3.00 . . 9.20
(Smooth Base, Pneumatic tire and tube)
8x3 2 ply $10.00
10x3.50 2 ply 10.55
12x4 2 ply 14.41
4.00x8 2 ply 13.10
14x4.50 2 ply 15.96

CASTERS—Now Available Write for circulars on all wheels.
No c.o.d. orders. Prices F.O.B. our plant.

JIM BROWN TOY COMPANY
1095 HOME AVENUE PS-654 AKRON 10, OHIO

FREE 10 U.S. STAMPS

COLORFUL set of 10 famous historic U. S. stamps—**all different**—sent FREE to secure names for our mailing list. Each stamp worth real money. We'll also send other interesting offers for your inspection, plus FREE copy of our helpful "How to Collect Stamps." Supply limited. Rush name, address and 10c to help cover actual postage and handling to:

LITTLETON STAMP CO., Dept. PS-6, Littleton, N. H.

OWN a Business

If employed, start part time. Alert dealers can gross $5 hourly profit on own service plus $3 on EACH serviceman. Clean, revive, mothproof rugs & upholstery on location. No shop needed. Services nationally advertised. Repeat customers. Easy to learn. We locally train and assist you. Quickly established. Easy terms. Send today for FREE booklet. No obligation.

DURACLEAN CO., 4-186 Duraclean Bldg., Deerfield, Ill.

STUDY AT HOME
WITH AN EDUCATIONAL INSTITUTION

Courses in **ARTS AND SCIENCES:** Philosophy; Education; Letters; Public Health; Medical Jurisprudence; Psychology; Sociology; Physics; Chemistry; Geology; Pol. Science; Theology; Law; Business and Commerce; Accounting; Mathematics; Statistics; Agriculture. **ENGINEERING:** Electrical, Civil, Mechanical, Drafting, Architectural, Steam, Diesel, Aeronautical, Radio, Structural, Mining, Industrial, Petroleum, Refrigeration, Chemical. Send for free catalog.

McKinley-Roosevelt Incorporated, 4610-A3, Sheridan Rd., Chicago 40, Illinois

CASTING SECRETS REVEALED!

Now you can learn how to make big money by casting thousands of perfect plaques, book ends, figurines, etc., with X.L. rubber molds.

NO EXPERIENCE, VERY LITTLE CAPITAL NEEDED.

X.L. Rubber, Pts. $2.50; Qts. $4.00 (postage extra). Molds and enough rubber for three molds, $1.50 prepaid. U.S. only. Send 25c (refunded with order) for informative catalog (40 pages) describing this wonderful, exciting *Profit-making* business.

HUGE PROFITS! MORE MONEY!

PLASTIC ARTS STUDIO 3403 S. MADISON, DEPT. 3 MUNCIE, INDIANA

NEW FALSE PLATE
FROM YOUR OLD ONE IN 18 HOURS

AS LOW AS $14.95

Send us your old broken, cracked or loose plates and we'll transform them into new lightweight wonder plastic plates. NO IMPRESSIONS needed with our revolutionary method. We use your own old plates. We remake them completely in only 18 hours. Missing teeth carefully matched and replaced. We GUARANTEE TO SATISFY YOU OR REFUND YOUR MONEY.

SEND NO MONEY—Send us your name today and we'll RUSH COMPLETE DETAILS. Begin to enjoy life right now. Clip this Ad; save it and send for free facts.

CHICAGO DENTAL PLATE LABORATORY • Dept PS-654
30 N. Dearborn St. • Suite 807 • Chicago 2, Ill.

Copyrighted material

Motorola CAR RADIO

Lowest Price Ever

only $39.95

MODEL 554

Motorola Pushbutton Model Car Radio

Luxury car radio at a budget price! New Volumatic Control. Five-station, push-to-lock push-button tuner. New larger speaker for new depth in tone. Easy on the battery. $54.95

. . . with new, exclusive

VOLUMATIC CONTROL

NO FADE-OUT **under bridges, viaducts, underpasses!**

Terrific buy! Powerful Motorola car radio is not only offered at the lowest price ever—but features the new, exclusive Volumatic Control. You set the volume—it's locked automatically. Won't fade out when you drive under bridges—anywhere there is a signal! Won't vary even when you change from station to station. Five tubes plus rectifier and superheterodyne receiver. Drive to your Motorola dealer for quick installation.

MODEL 404

Better See Motorola Golden Voice Radio

Copyrighted material

DRAFTSMEN

CASH BIG PAY CHECKS!

Train Now for more success, greater security

LEARN AT HOME IN SPARE TIME
(or at college in Chicago)

Check the want ads in any newspaper—SEE the big-pay opportunities open to you as a draftsman. What's more, you can learn this well-paid, prestige profession at home—quickly, easily! No special talent needed. Get complete, step-by-step Chicago Tech lessons in the mail, spend a few pleasant hours studying each week. In a short time you'll be a well-trained draftsman, ready to take your pick of many good jobs. Act now!

FREE INFORMATION—MAIL COUPON TODAY!
Get FREE TRIAL LESSON plus information about C.T.C. practical training. Learn what successful Chicago Tech graduates say about high pay and opportunities in drafting. No charge, or obligation.

CHICAGO TECHNICAL COLLEGE

G-222 Tech Bldg., 2000 So. Michigan Ave.
Chicago 16, Illinois
Mail me FREE Lesson with information about big opportunities in DRAFTING.

Name.....Age.....

Address.....

City.....Zone....State.....

Inventors

The following are the usual preliminary steps to take toward patent protection.

Make a disclosure of your invention; sign, date and have this document witnessed by two or more people who understand your invention; authorize your registered patent attorney or agent to conduct a preliminary search among previously granted U. S. patents for similar types of invention; secure a report on the probable patentability of your invention and a recommendation of the further course to take.

We shall be glad to send you without obligation our instructive booklet, "Patent Protection for Inventors" and our "Evidence of Invention" disclosure form.

VICTOR J. EVANS & Co. *Merlin M. Evans*
REGISTERED PATENT ATTORNEY
940-G MERLIN BUILDING, WASHINGTON 6, D. C.

30 POWER! WHISPER WEIGHT 8½ OUNCES

Newest Pocket Telescope engineered for **UNITED** to give you sharper, clearer, crisper images and smooth, easy-sliding focusing action. Use indoor, outdoor, vacationing, trips, closeup and long distance viewing. 7" closed, 14½" extended.

NOT A CHEAPLY MADE TOY TELESCOPE. But a precision, all metal, chrome trimmed achromatic masterpiece. Interiors of **VITAL** front Achromatics are **COATED** assuring needle sharp viewing! Price includes handsome carrying case. Made in Japan. **UNCONDITIONALLY GUARANTEED.** Try for 30 days. If not satisfied return for immediate refund. Cash orders postpaid. C.O.D.'s require $2.00 deposit. **UNITED BINOCULAR CO., 9043 S Western Ave., Dept. C-9616, Chicago 20, Illinois. Dealers wanted.**

$9.95
Tax Free

INVENTORS

I shall be pleased to furnish you, upon request, with information relative to patent procedure—without any obligation on your part.

PATRICK D. BEAVERS
Registered Patent Attorney
937 Columbian Building, Washington 1, D. C.

INVENTORS

Send for PATENT INFORMATION Book and INVENTOR'S RECORD without obligation

GUSTAVE MILLER
64-PS WARNER BUILDING
WASHINGTON 4, D.C.

REGISTERED PATENT ATTORNEY
ASSOCIATE EXAMINER U.S. PAT. OFF. 1922-1929
Patent Attorney & Advisor U. S. NAVY DEPT. 1930-1947
PATENT LAWYER

PATENTS

C. A. SNOW & CO.
REGISTERED PATENT ATTORNEYS
WRITE FOR INFORMATION TO
426 SNOW BUILDING, WASHINGTON 1, D. C.

INVENTORS

Whether an invention is patentable can be substantially determined by a search of the U. S. Patent records. Without obligation, write for information explaining the steps you should take to secure a patent.

JOHN N. RANDOLPH
Registered Patent Attorney
205 Columbian Building Washington 1, D. C.

INVENTORS

IF YOU WISH TO PROTECT YOUR INVENTION, You should take steps to protect it by a U. S. Patent. Write me for "INVENTION RECORD" FORM

CARL MILLER
REGISTERED PATENT ATTORNEY
WOOLWORTH BLDG., 35th FLOOR, 64C
NEW YORK CITY

Copyrighted material

START YOUR OWN BUSINESS (FULL or SPARE TIME)

with ROTO-HOE GARDEN TOOLS

In many communities we need active mechanically-inclined men as dealers to sell and service ROTO-HOE and attachments. It's pleasant, outdoor work and you will find it's easy too. These popularly priced power garden tools have won the hearts of tens of thousands of American home owners and gardeners—in fact, ROTO-HOE is now the largest selling tool of its kind in the world!

If you are not afraid to get out, make calls, and demonstrate ROTO-HOE, and do the small amount of servicing required, you should be able to develop your own highly profitable spare time (or full time) business—on a minimum investment. We furnish you names of prospects in your neighborhood also circulars, catalogs, and other sales material.

Write today for full information—it may be the opportunity you wanted for years!

ROTO-HOE & SPRAYER CO., Box 18, Newbury, Ohio

EARN $10 PER HOUR

GROWING MIDGET TREES!

AT HOME! · SPARE TIME! · NO EXPERIENCE NEEDED!

It's New! Amazing! FULL GROWN living dwarf trees — only 12 INCHES HIGH! Elm, orange, oak, cypress—any kind! All BLOOM and even BEAR FRUIT. Perfect, healthy specimens, but miniature! Make costly home decorations and beautiful expensive centerpieces (sold for over $1,500 each). It's easy! Fun! A new fascinating artistic HOBBY — a new fabulous $$$$$$ BUSINESS! Real seed and sensational new growing secret plan details, BOTH FREE!

FREE! GENUINE SEED AND PLAN

NATIONAL NURSERY GARDENS, Dept. N6
8463 S. Van Ness, Inglewood 4, Calif.

"How to Make Money with Simple Cartoons"

A book everyone who likes to draw should have. It is free; no obligation. Simply address

FREE BOOK

CARTOONISTS' EXCHANGE
Dept. 196D, Pleasant Hill, Ohio

GO PLACES

LEARN ANOTHER

LANGUAGE

EASILY — QUICKLY

by LINGUAPHONE

IN 20 MINUTES A DAY

***World's-Standard* CONVERSATIONAL METHOD**

FRENCH
SPANISH
ITALIAN
GERMAN
RUSSIAN
JAPANESE
PORTUGUESE
—any of 29 Languages

Are interesting job, travel, cultural, armed services' opportunities passing you by because you speak only one tongue? Learn another language **AT HOME** the same, natural, easy way you learned English long before you went to school. **YOU LISTEN**—you hear native men and women speak—you understand—**YOU SPEAK.** Worldwide educational endorsement; over a million home-study students of all ages. **FREE BOOK,** "Passport to a New World of Opportunity," gives fascinating facts. **WRITE TODAY!**

LINGUAPHONE INSTITUTE, 147-06 RCA Building, N.Y. 20, N.Y.

Send me your FREE book. I want to learn.....language.

Name.....

Address.....

City, Zone & State.....

Now-an easy way to wash your car!

JUST SPONGE IT ON — RINSE IT OFF!

FAST-ACTING, ECONOMICAL DU PONT CAR WASH

NEW DU PONT CAR WASH cleans faster and easier than you ever thought possible. Just sponge it on . . . rinse it off . . . and your car *dries itself*. No wiping or chamois work! Du Pont Car Wash gets off *all* the grease and grime . . . leaves your car spotless.

One tablespoonful washes your car. Half-pound can gives 20 washes!

DU PONT № 7® PRODUCTS

From Chemical Research . . . For Easier Car Care

DU PONT

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Copyrighted material

NOW! HERE'S HOW TO Fix ANY Car IN LESS TIME . . .

Brakes, Clutches, Transmissions, Carburetors, Rear Ends, etc.

FREE 7-DAY TRIAL

BRAND-NEW 1954 Edition of MOTOR'S Manual Shows You How To Repair — Quickly and Easily—Any Car Built from 1940 THROUGH 1954!

NO job is too tough when you've got MOTOR'S brand-new AUTO REPAIR MANUAL. Shows how to save work on "ornery" jobs. Helps you make MORE MONEY by doing *more* jobs in *less* time! Now covers 1954 models; up-to-date information on all new automatic transmissions, carburetors, power steering, etc.

COVERS 685 MODELS BUILT SINCE 1940!

Buick, Cadillac, Chevrolet, Chrysler, Crosley, De Soto, Dodge, Ford, Frazer, Henry J, Hudson, Kaiser, Lincoln, Mercury, Nash, Nash Rambler, Oldsmobile, Packard, Plymouth, Pontiac, Studebaker, Willys

Includes ALL 1954 Cars!

COMPILED FROM 140 OFFICIAL SHOP MANUALS!

This great book — 1,000 BIG 8½" x11" pages—brings you the complete "dope" from 140 Official Shop Manuals, boiled down in simple easy-to-understand language. 2,950 cut-away photos, diagrams, drawings show WHAT to do, HOW to do it. 225,000 service and repair facts! Over 685 chassis models! Now YOU can try it FREE—for 7 days.

Same FREE Offer On MOTOR'S Truck and Tractor Manual

Latest Edition! Covers EVERY job on EVERY popular make gasoline truck, tractor, stock engine made from 1939 thru 1953. 904 big pages, 300,000 facts, 2,200 pictures. Check proper box in coupon. FREE 7-Day Trial.

SEND NO MONEY

Mail coupon below — *without money!* When your book arrives—*make it show you what it's got!* Unless you agree it's the greatest time and work saver you've ever seen—return book in 7 days, pay nothing. Mail coupon NOW! MOTOR Book Department, Desk 2F, 250 West 55th Street, New York 19, N. Y.

MAIL COUPON NOW FOR 7-DAY FREE TRIAL

MOTOR BOOK DEPT.
Desk 2F, 250 W. 55th St., New York 19, N. Y.

Rush to me at once (check box opposite book you want):

☐ **MOTOR'S** *New* **AUTO REPAIR MANUAL.** If O.K., I will remit $1 in 7 days, $2 monthly for 2 months and a final payment of 95c (plus 35c delivery charges), one month after that. Otherwise I will return the book postpaid in 7 days. *(Foreign price, remit $8 cash with order.)*

☐ **MOTOR'S** *New* **TRUCK & TRACTOR REPAIR MANUAL.** If O.K., I will remit $2 in 7 days, and $2 monthly for 3 months, plus 35c delivery charges with final payment. Otherwise I will return book postpaid in 7 days. *(Foreign price, remit $10 cash with order.)*

Print Name..... Age.....

Address .....

City..... State.....

☐ **Check box and save 35c delivery charge** by enclosing WITH coupon entire payment of $5.95 for Auto Repair Manual (or $8 for Truck and Tractor Repair Manual.) Same 7-day return-refund privilege applies.

SELF-CONTAINED DIVING—A comprehensive diving digest reviewing various types of equipment and a thorough study of underwater pressure and its effects. Includes a decompression table showing how much time can be safely spent at various depths. Send now **60c** in coin to receive this 95c booklet.

DIVING GEAR—A 16 page beautifully illustrated catalogue showing the latest available foreign and domestic diving equipment: frogman suits, masks, spear guns, snorkle tubes, swim fins and "Aqua-Lungs." Send only **15c** in coin.

SEND FOR THESE VALUABLE BOOKLETS TODAY
U. S. DIVERS CO. 1045 Broxton Ave., W. Los Angeles 24, Cal.

How to Make Money in PHOTOGRAPHY

If you are OVER 17—good pay, fascinating work await you in photography! Start making money quickly in sparetime—step into your own studio or exciting job. LEARN-BY-DOING method trains you at home! Write TODAY for FREE catalog. Also Resident Training. 44th Year! GI Approved.

Send for FREE BOOK

NEW YORK INSTITUTE OF PHOTOGRAPHY
Dept. 5, 10 W. 33 St., New York 1, N. Y.

LAW

Men and Women **STUDY AT HOME** for Business Success and **LARGER PERSONAL EARNINGS,** 44 years expert instruction—over 114,000 students enrolled. LL.B. Degree awarded. All text material furnished. Easy payment plan. Send for FREE BOOK —"Law and Executive Guidance"—NOW!

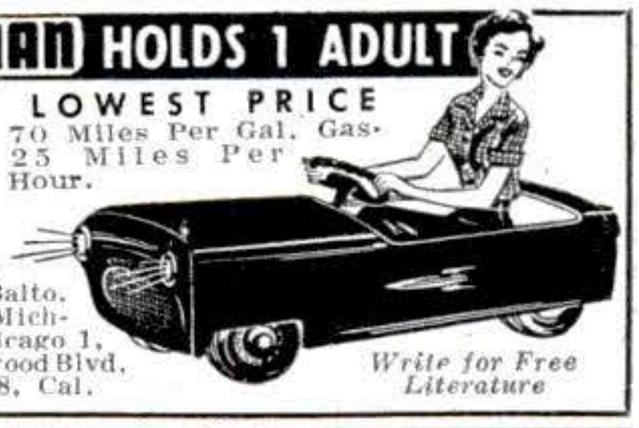
AMERICAN EXTENSION SCHOOL OF LAW
Dept. PS-75, 664 N. Michigan Ave., Chicago 11, Illinois

ESHELMAN HOLDS 1 ADULT

ALSO CHILD's 2 PASS. MOTOR CAR Write for Free Literature

AUTO WITH MOTOR

LOWEST PRICE
70 Miles Per Gal. Gas.
25 Miles Per Hour.



ESHELMAN, Dept. CM-66
119 Light St., Balto. 2, Md. 333 N. Michigan Ave., Chicago 1, Ill. 7070 Hollywood Blvd. Los Angeles 28, Cal.

Write for Free Literature

BUILD LUGGAGE AT HOME WE SELL YOUR PRODUCTS!

Only New Home Money-Making Plan in Years!

Make Luggage and cases for traveling, photographers, musicians, salesmen, electronics, tools, portables, 1001 other items. Also repair Luggage. No special equipment needed. BIG Profits. We supply complete instructions—everything. Write for free details and Business Plan. ABARSI CASECRAFT Dept. C11, 805 W. Sunset Blvd., Los Angeles 12, Calif.

Build Your Own Mower with

POWER MOWER KITS

FREE PLANS **LOW FACTORY PRICES DIRECT TO YOU**

With Triangle's precision made, ready to use Kits, Parts and Engines, you can easily build as fine performing power mower as you could buy ready made, at a Big Saving. Our Free Plans guide you. Choose from: 6 build-it-yourself Kits, 4 models of complete mowers with or without engines; and 4 models ready to assemble at a Big Saving. 18 or 20 inch sizes in 3 and 4 wheel models—belt or direct drive. Our guarantee protects you and our LOW FACTORY PRICES DIRECT TO YOU save you up to 40%. Write TODAY for your set of Free Plans and complete descriptive literature.

3-WHEEL KIT NO. T-800

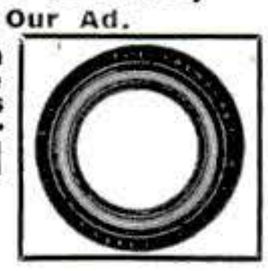
TRIANGLE MANUFACTURING CO., Box S-30, Fort Scott, Kansas

Copyrighted material

WHY PAY MORE? Family-safe Partially-used **TIRES (NOT RECAPS)**

Month After Month, For Years, You See Our Ad.

FREE This Pictured Tire Ash Tray with your name with two or more tires



Car Tires $3 (20 Mo. Guar.) Truck Tires $11

TAKE 10% DISCOUNT

Goodyear, Firestone, Gdch, U.S. & Others.

Finest Grade

AMERICA'S MOST RESPECTED GOLDEN-RULE

32 Mos. Guarantee

32 Mos. Guarantee

FREE REPLACEMENT IF DEFECTIVE

32 Mos. Guarantee

Tough, Rugged truck Tires

6-8-10-12-14-Ply Tires

600-16	$5.14	640-15	$4.84	750-15	$10.84	32x6(10)	$13.14
600-16(6)	6.64	670-15	5.24	750-16(8)	9.34	750-20	13.24
650-16	5.64	710-15	5.34	700-17	8.94	825-20	17.74
650-16(6)	7.14	760-15	5.84	750-17	11.84	900-20	17.84
700-16	6.24	800-15	6.24	600-20	8.24	1000-20	16.84
700-16(6)	7.24	820-15	6.24	650-20	9.74	1100-20	17.84
750-16(6)	8.34	650-15	5.14	700-20	10.74	1000-22	18.04
550-17	4.44	700-15	5.24	32x6(8)	10.74	1100-22	18.04

WHITEWALLS $1 EXTRA

MILITARY MUD-GRIP TIRES (Not Retreads)

750-20 Super 20 Mos $12.22 Rugged 34 Mos $14.44

900-16 Super 20 Mos $12.22 Rugged 34 Mos $14.44

"I have personally pinpoint inspected every tire, as if our very future depended on it. There's not 1 tire here I wouldn't use myself. I ask one chance to treat you right." Mort Blatt, Mgr.
—Faithfully serving motorists, hospitals, schools & churches since 1917.

BLATT Phila., Pa., 11th and Spring Garden St. Miami, Fla., 2827 N.W. 7th Ave.

Order from our nearest store. Send Ck. or M.O. & this ad.
—Thousands of shipments rushed all over the world.

MONEY for MEN ALL DATA FREE

THE PLASTEX Industry needs manufacturers on small scale and for big production of Lamp and Clock Stands, Art Goods and Novelties in Plastex and Marble imitation. Experience unnecessary. ½c material makes regular 10c store sellers. Rubber moulds furnished for speed production. Small investment brings good returns. We are now placing big chain store orders with manufacturers. Ambitious men have chance for real prosperity. Our Free booklet will interest and benefit you.

PLASTEX INDUSTRIES, Dept. 2, 3400 Third Ave., New York 56, N. Y.

★ WORK FOR UNCLE SAM ★

U. S. GOV'T. JOBS! AS HIGH AS $3,795.00 YEAR TO START. Men, women, 18-55. Common education often sufficient. Write immediately for FREE 36-PAGE BOOK with list of positions, sample tests and full particulars telling how to qualify for them. (Not Gov't. Controlled)

Franklin Institute, Dept. N-80, Rochester 4, N. Y.

WATCHMAKING

Why spend all your life at dull, backbreaking work? Watchmaking is light, clean, fascinating. Lifelong livelihood. Learn the quick Sweazey way at home or Chicago School. Modern methods, step-by-step. No previous experience needed. Individual training. Start any time. Approved for vets. Send for FREE sample lesson. No obligation. Write!

CHICAGO SCHOOL OF WATCHMAKING

2330 N. Milwaukee Avenue, Dept. 464, Chicago 47, Illinois

BUILD 15 RADIOS

AT HOME WITH THE PROGRESSIVE RADIO "EDU-KIT"

ONLY **$19.95** COMPLETE

All Parts, Instructions, Soldering Iron, Tester Included. Money Back Guarantee.

PROGRESSIVE "EDU-KITS" INC.
Dept. PS-516, 497 Union Ave., Bklyn. 11, N.Y.

PROGRESSIVE "EDU-KITS" INC.
Dept. PS-518, 497 Union Ave., Brooklyn 11, N. Y.
RUSH ME THE FOLLOWING:
☐ Free Descriptive Literature—No Obligation.
☐ Free Valuable Radio and TV Guides—No Obligation.

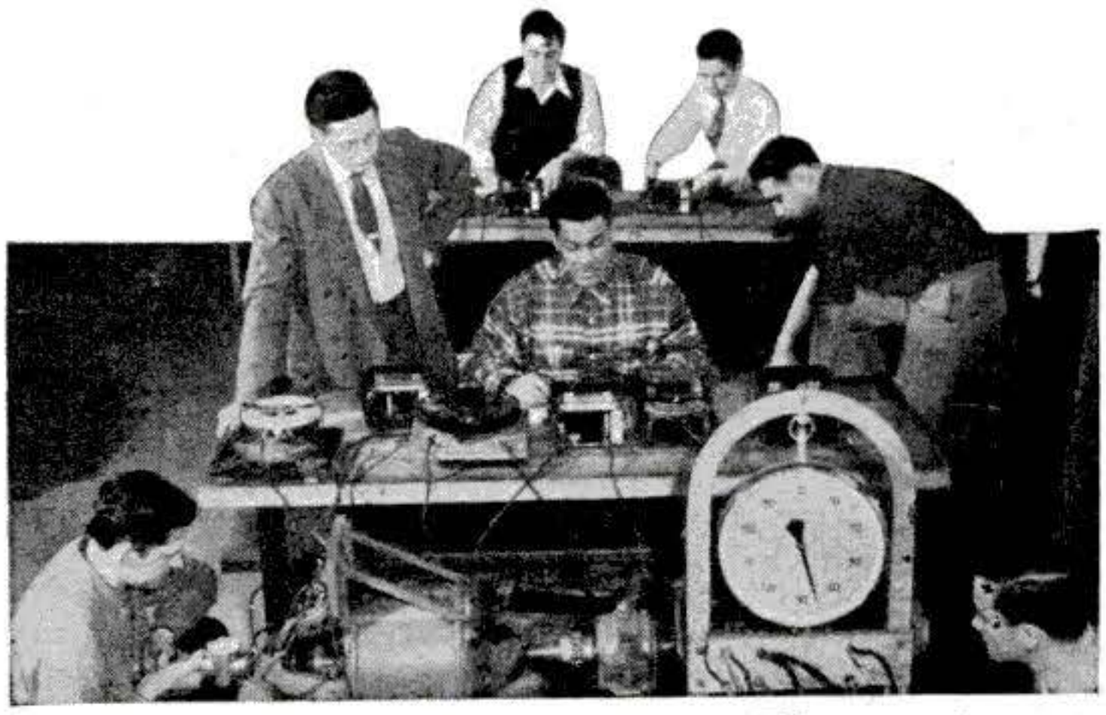
Name .....

Address .....

City ..... Zone .... State .....

Become an Electrical Engineer

with Bachelor of Science Degree in 36 months



Major in Power or Electronics at Milwaukee School of Engineering

Over 50% of the nation's industrial leaders began their careers with engineering training. Prepare now for a rewarding future as an Electrical Engineer or Engineering Technician. Enroll at the Milwaukee School of Engineering.

Plan Your Career — Eight Courses Give You Wide Range of Study

ENGINEERING COURSES
Electrical Engineering-Bachelor of Science Degree
Save a valuable year through optional year 'round study.
Electronics major ..... 36 months
Power major ..... 36 months

TECHNICIAN COURSES
Electro Technician ..... 12 months
Electronic Technician ..... 12 months
Radio Technician ..... 12 months
Radio and Television Technician ..... 18 months

SERVICE COURSES
Electrical Service ..... 6 months
Radio and Television Service ..... 12 months

Terms open July, September, January, April
Approved for veterans. Prior Military, Practical or Academic training evaluated for advanced credit. Faculty of specialists. 50,000 former students. Annual enrollment from 48 states and 23 overseas countries. 51st year. Non-profit. Residence courses only. Send handy coupon today.

MECHANICAL TECHNOLOGY COURSES — Also available, Service and Technician courses 6 to 18 months — Heating, Refrigeration, Welding, Air Conditioning and Mechanical —B.S. Degree in Mechanical Engineering with a major in Design, Metal Fabrication, or Plant Engineering.
Also, general 3-month preparatory course.

MS-7A

MILWAUKEE SCHOOL OF ENGINEERING

MILWAUKEE SCHOOL OF ENGINEERING
Dept. PS-654, 1025 N. Milwaukee St., Milwaukee, Wis.
Send free illustrated career booklets ☐ Electrical Technology ☐ Mechanical Technology ☐ Radio-Television.
I am interested in _____
(name of course)
Name _____
Address _____
City _____ Zone _____ State _____
If veteran, indicate date of discharge _____

Copyrighted material

THE NEW MODEL TV-11

TUBE TESTER

SPECIFICATIONS

- Uses the new self-cleaning Lever Action Switches for individual element testing. Because all elements are numbered according to pin-number in the RMA base numbering system, the user can instantly identify which element is under test. Tubes having tapped filaments and tubes with filaments terminating in more than one pin are truly tested with the Model TV-11 as any of the pins may be placed in the neutral position when necessary.
- The Model TV-11 does not use any combination type sockets. Instead individual sockets are used for each type of tube. Thus it is impossible to damage a tube by inserting it in the wrong socket.
- Free-moving built-in roll chart provides complete data for all tubes.
- Phono Jack on front panel for plugging in either phones or external amplifier will detect microphonic tubes or noise due to faulty elements and loose external connections.

Operates on 105-130 Volt 60 Cycles A.C. Hand-rubbed oak cabinet complete with portable cover. **$47.50**

SHIPPED ON APPROVAL

NO MONEY WITH ORDER—NO C. O. D.

Try it for 10 days before you buy. If completely satisfied send $11.50 and pay balance at rate of $6.00 per month for 6 months—No Interest or Carrying Charges Added. If not completely satisfied, return to us, no explanation necessary.

MOSS ELECTRONIC DISTRIBUTING CO., INC.
Dept. D-33, 3849 Tenth Ave., New York 34, N. Y.
Please rush 1 Model TV-11. I agree to pay $11.50 within 10 days after receipt and $6.00 per month thereafter.

Name.....

Address.....

City.....Zone.....State.....

start a big profit business with a small investment EARN UP TO $200 a DAY

Manufacturing Exciting New

RAINBOW ROCK

Concrete Slump Brick in your back yard

Earn big building boom profits with Rainbow Rock, the colorful new building brick that's taking the country by storm. Sell all you can make to contractors, builders, building supply houses. **RAINBOW ROCK CUTS LABOR COSTS BY 1/3!** Amazing low cost machine makes modern slump brick 24" long (3 times the length of ordinary brick) in a variety of widths and pastel colors . . . up to 1500 bricks a day! **NEEDS NO SPECIAL SKILL.** Operates indoors or out. Full instructions and valuable mixing formulae supplied. **YOU CAN START EARNING BIG MONEY NOW. PAY AS YOU PROFIT!** A limited number of machines available on easy payment terms. **NOW** is the time to start. Write today for free literature and full information.

GENERAL ENGINES CO., INC.
Dept. SR-64 —307 Hunter Street
Gloucester, N.J. • Gloucester 6-1337

STEEL PIER SENSATION
Luxurious RAINBOW ROCK fireplace wall in living room of the "Home of the Century" in Atlantic City, N. J.'s Steel Pier . . . acclaimed by over 500,000 Summer, 1953 visitors as the most beautiful they'd ever seen! Endorsed by the Pier's famous architect, William F. B. Koelle.

Makes beautiful, decorative fences, garden walls, garages, outside walls, room separators, etc.

DON'T SETTLE FOR *Less!*

SEND FOR THE STORY OF THE WORLD'S MOST ADVANCED MOWER

GEORGE

ADD-TACHMENTS FOR USE WITH SAME POWER UNIT
- DUMP BARROW
- SNOW PLOW
- GARDEN TOOLS

SELF-PROPELLED
ROTARY MOWER 20"
ONLY $159.00 F.O.B.

WRITE FOR ILLUSTRATED BROCHURE
Dept. A GEORGE GARDEN TOOLS • SULLIVAN, ILL.

TELEPHONES

Desk Stand Style

Slightly used but in excellent condition

Many Valuable Uses

Inter-House Phones — House to Barn, etc.
Loud Speakers — Microphones
Educational Purposes, Toys, etc.

Come complete, ready to use with wiring diagrams included. Two complete for only $5.00 **$2.75** Postpaid in U.S.A.

TELEPHONE LAMP KIT—with illustrated instructions for making Desk Telephone Lamp including all parts (harp, nipples, push switch, cord, plug, etc.) . . . . $6.50 Ppd. (Shade is not included).

MICROPHONE, Dept. X-1104, 1760 W. Lunt Ave., Chicago 26, Ill.

FREE FOR ASTHMA

If you suffer with attacks of Asthma and choke and gasp for breath, if restful sleep is difficult because of the struggle to breathe, don't fail to send at once to the Frontier Asthma Company for a FREE trial of the FRONTIER ASTHMA MEDICINE, a preparation for temporary symptomatic relief of paroxysms of Bronchial Asthma. No matter where you live or whether you have faith in any medicine under the sun, send today for this free trial. It will cost you nothing.
FRONTIER ASTHMA CO. 413-W FRONTIER BLDG.
462 NIAGARA ST. BUFFALO 1, N. Y.

BARBELLS

140-Pound, **CHROME DELUXE** Barbell-Dumbbell set only **$16.80.** This is our feature set and is the finest ever manufactured.
Training with adjustable weight is the **BEST** way to keep fit; the **ONLY** way to develop great strength and a perfect body. As the oldest and best equipped barbell company, BUR gives value and prices no one can equal.

100 POUND SET $9.80

Extra Plates Only 10c Pound

SEND FOR FREE CATALOG.
BUR BARBELL CO.
Lyndhurst 5, New Jersey

When Writing To Advertisers Please Mention Popular Science

The QUICK-WAY to SHARPEN CIRCULAR SAWS

The complete sharpener, featured in FORTUNE and other leading magazines. Anyone can use . guarantees precise grinding and spacing of teeth. Operates on your own power table. Complete with patented Index Plate, facing block for mitre and $3.00 grinding wheel—no extras needed. Sharpens circular saws up to 12" diameter. Saves time and money.
Send check, cash or money order. We pay postage.

Model 6-12P
$16.50 *Postpaid*

QUICK-WAY Saw Company
13 Riverside Corning, N.Y.

Copyrighted material

Price! Profit! Prospects!

SENTRY SAFES give you all 3

PRICE: 35% to 50% lower than comparable small safes. PROFIT: Because your *cost* is low, you can take a big mark-up and still undersell all competition. Just *one* SENTRY sale a day can bring you $8,000 a year! PROSPECTS: 95% of the personal safe market (professional men, executives, farmers, householders) untouched because only SENTRY offers such quality fire and theft protection for so little. Choice, exclusive territory. Drop shipments if desired. Send for full details.

Write to Dept. PS-6
giving address, including county.

BRUSH-PUNNETT CO.
545 WEST AVE., ROCHESTER 11, N. Y.

LEARN TO DANCE $1.00

Why be a lonely, unpopular wall-flower? Learn all the smart dances from the most modern to the old favorites—at home, in private without teacher, music or partner. So simple even a child can learn quickly. Tap dancing, Waltz, Collegiate, Samba, Rhumba, Jitterbug and many others, including illustrations. Complete course only $1.00. Also, delightful old square dances with illustrations for $1.00. Get each Separate or both for $1.98. If you order both take your choice of FREE-DREAM BOOK or LOVE LETTERS. C.O.D. orders 25c extra and Postage.

Professional taps, toes and heels $2.98 prepaid or C.O.D. plus shipping charges.

ROLLDEX, P. O. Box 516, Dept. D-85, Safety Harbor, Fla.

SEA LEGS

PRICES from $39.00

QUALITY BOAT KITS F. O. B. DEFIANCE, OHIO

WRITE FOR FREE LITERATURE

PENNEY WOODCRAFT INDUSTRIES

1301-09 Ottawa Ave., Dept. 6-P Defiance, Ohio

Sample IMPORTS

FROM FOREIGN LANDS—Exciting, useful sample, products from France, Germany, India, etc., sent to you. Established Import-Export firm offers men or women **FREE** plan for big profit, world-wide, mail-order business at home; or travel abroad. No capital or previous experience needed. Overseas bargains bring high U. S. prices. Write today for **FREE** plan!

Mellinger, Dept. A246, 1717 Westwood, Los Angeles 24, Cal.

INVESTIGATOR TRAINING

Experience unnecessary. Many opportunities. Send for Free particulars. Free credentials.

EXCHANGE SECRET SERVICE SYSTEM
4360 Broadway Chicago 13, Ill.

MAIL COUPON FOR QUICK ACTION!

Exchange Secret Service System
4360 Broadway, Chicago 13, Ill.

Without cost or obligation please mail Free particulars

Name.....

Address.....RFD or Zone.....

City.....State.....

"HOW I MADE MY HOBBY PAY OFF!

I've always been interested in cars, then one day I met Joe..."

SHOP-TESTED HOME TRAINING

AUTO MECHANICS & DIESEL

NATIONAL SCHOOLS

Technical Trade Training Since 1905

LOS ANGELES 37, CALIFORNIA

In Canada: 811 West Hastings Street, Vancouver, B.C.

APPROVED FOR G.I. TRAINING. Both Home Study and Resident courses offered. Job placement assistance, too! Find out today!

MAIL NOW TO OFFICE NEAREST YOU!

(mail in envelope or paste on postal card)

NATIONAL SCHOOLS, Dept. DC-64

4000 S. FIGUEROA STREET LOS ANGELES 37, CALIF. or 323 WEST POLK STREET CHICAGO 7, ILL.

Please rush FREE BOOK "Your Future in Auto Mechanics & Diesel," and FREE LESSON. I understand there is no obligation, no salesman will call.

NAME_____ BIRTHDAY_____ 19__

ADDRESS_____

CITY_____ ZONE____ STATE_____

☐ Check if interested **ONLY** in Resident Training at Los Angeles.

VETERANS: Give date of discharge_____

Copyrighted material

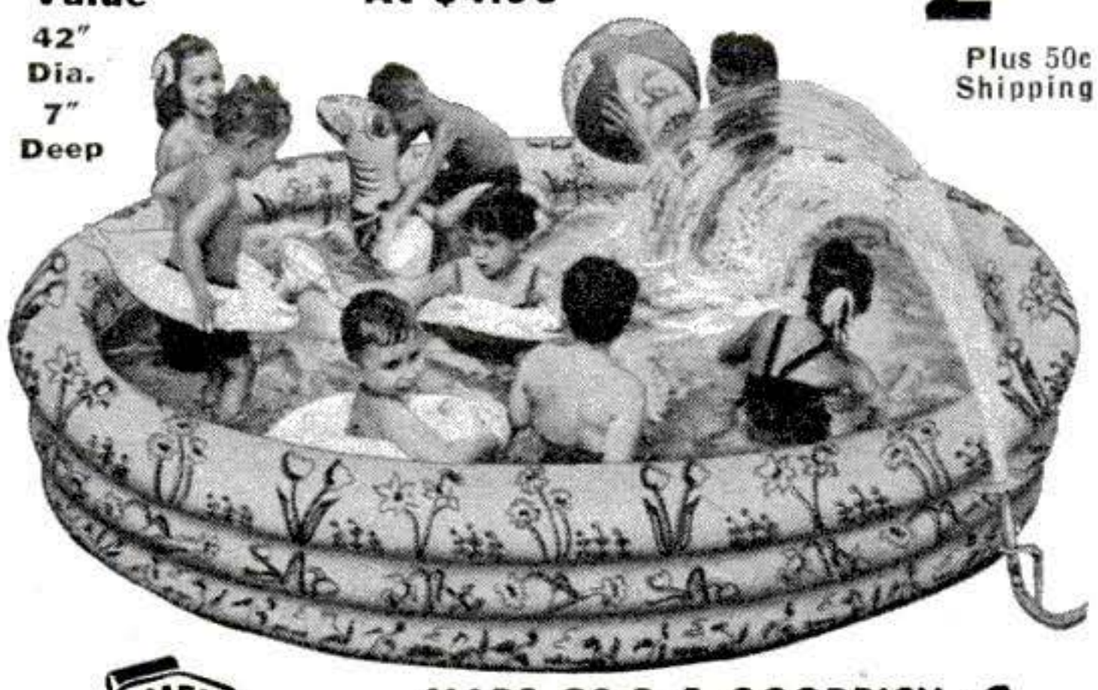
GIANT KIDDIE PLAY POOL

Hold Up To 8 Children Comfortably

Amazing Value — **Nationally Sold At $4.98** — **Only $2.98**

42" Dia. 7" Deep

Plus 50c Shipping



COMMENDED BY THE CONSUMER SERVICE BUREAU OF PARENTS' MAGAZINE AS ADVERTISED THEREIN

MADE OF B. F. GOODRICH

Koroseal

LIFETIME GUARANTEE
ALL NEW 1954 MODELS

- **Adjustable Directional Drainage**
- **Play-Spray Shower Included**
- **Colorful Overall Decorations**
- **Home Inflating Device Included**
- **Sizes From 42 in. To 9 ft. Dia.**

A PRIVATE SWIMMING POOL ALL THEIR OWN FOR YOUR ENTIRE FAMILY TO SPLASH IN! Big enough to swim in—yet shallow enough to be safe for everyone. Endless fun with all the different ways they can play—cooling carefree frolic in the water plus the added joy of bouncing on the broad air cushioned seat. Made of heavy gauge Koroseal. No dangerous sharp corners. Easy to keep clean. Rot and mildew proof. Lifetime guarantee against defects in material or manufacture. Your satisfaction unconditionally guaranteed.

AVAILABLE IN THE FOLLOWING RANGE OF SIZES:

42" Dia. 7" deep. Over 11 ft. around. Two Ring Construction. Holds 1 or 2 children and 38 gallons. No shower included with this model. Nationally sold at $4.98. **OUR PRICE—$2.98** plus 50c shipping or C.O.D. plus postage.

54" Dia. 10" deep. Over 14 ft. around. Two Ring Construction. Holds 2 or 3 children and 70 gallons. Nationally sold at $7.00. **OUR PRICE—$4.98** plus 50c shipping or C.O.D. plus postage.

68" Dia. 12" deep. Over 17 ft. around. Two Ring Construction. Holds Mom and Dad too, plus 150 gallons. Nationally sold at $15 up. **OUR PRICE—$8.95** plus 50c shipping or C.O.D. plus postage.

80" Dia. 12" deep. Over 20 ft. around. Two Ring Construction. Holds 6 children easily and 225 gallons. Nationally sold at $23 up. **OUR PRICE—$11.95** plus 50c shipping or C.O.D. plus postage.

90" Dia. 15" deep. (ILLUSTRATED) Over 23 ft. around. Three Ring Construction. Holds 8 children and 350 gallons. Deep enough to swim in. Nationally sold at $30 up. **OUR PRICE—$17.95** plus 50c shipping or C.O.D. plus postage.

108" Dia. 15" deep. Over 28 ft. around. Three Ring Construction. Holds 4 adults easily and 500 gallons. Nationally sold at $50 up. **OUR PRICE—$24.95** plus 50c shipping or C.O.D. plus postage.

P. J. HILL CO. Dept. S-577
933 BROAD ST. NEWARK, N. J.

Start Your OWN ELECTRICAL APPLIANCE REPAIR BUSINESS

Repair electrical appliances of friends and neighbors. Service electrical equipment in factories, stores, etc. Work full or part time! New Shop Method home-training system. Rush name today for **FREE BOOK** and special form for getting Electronic Kit, Valuable Heating Element Kits, Advisory Service and Illustrated Instructions on new easy-payment plan. Pay later from **EARNINGS WHILE LEARNING.** Rush name today.

CHRISTY TRADES SCHOOL
4804 N. Kedzie, Dept. D-4001, Chicago 25

---

60 POWER TELESCOPE $3.98

VARIABLE EYEPIECE 20x-40x-60x—BRASS BOUND

NEW! Three telescopes in one. 3 different magnifications. 20 power for ultra-bright images with 40 and 60 power for extra long range. Guaranteed to bring distant objects, people, sports events, ships, moon, stars, etc. 60 times as close. Made in U.S.A.

Most powerful for anywhere near the money. 5 Sections. Closes to 1 ft. long. Contains 4 ground and polished lenses. Also used as a powerful compound microscope. Directions included. Mass production enables us to offer this instrument at amazing price of $3.98 complete. Money back guarantee. We pay postage. Get yours now.

As A Microscope

CRITERION CO.
DEPT. PSB22
331 CHURCH ST.
HARTFORD 1, CONN.

MAXIM SILENCERS

QUIET

LAWN MOWERS
GARDEN TRACTORS

Here it is . . . a world-famous Maxim Silencer that you can install easily on any power lawn mower or garden tractor powered by a 4-cycle air-cooled engine. Prices postpaid: $6.00 (1/2"); $7.25 (3/4"); $9.00 (1"). If inside diam. of engine exhaust port measures 13/16", order 1/2" silencer; 1-1/6", order 3/4" silencer; 1-15/16", order 1" silencer. Sorry, no C.O.D.'s.

ASK YOUR DEALER OR WRITE DIRECT
THE MAXIM SILENCER COMPANY
122 HOMESTEAD AVE., HARTFORD 1, CONN.

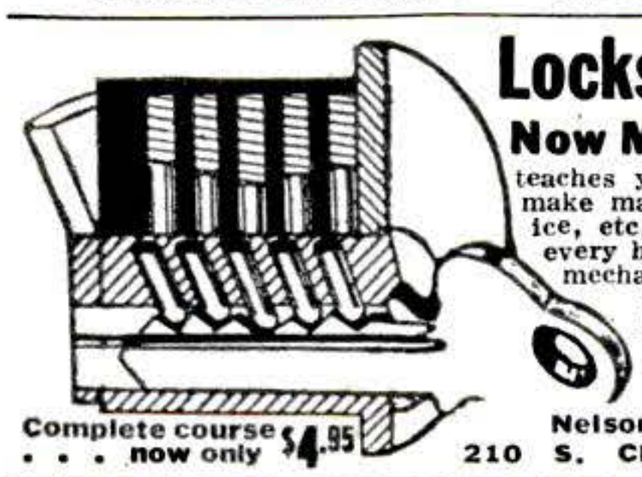
REAL ESTATE — BE A BROKER

PAYS BIG! SEND FOR FREE, BIG, ILLUSTRATED CATALOG NOW! Graduates report making substantial incomes. Start and run your **own business quickly.** Men, women of all ages, learn easily. Course covers Sales, Property Management, Appraising, Loans, Mortgages, and related subjects. **STUDY AT HOME** or in classrooms in leading cities. Diploma awarded. Write TODAY for free book! No obligation.

FREE BOOK TELLS HOW

Approved for World War II and Korean Veterans

WEAVER SCHOOL OF REAL ESTATE (Est. 1936)
Suite 300 Law Bldg. Dept. PS Kansas City, Mo.

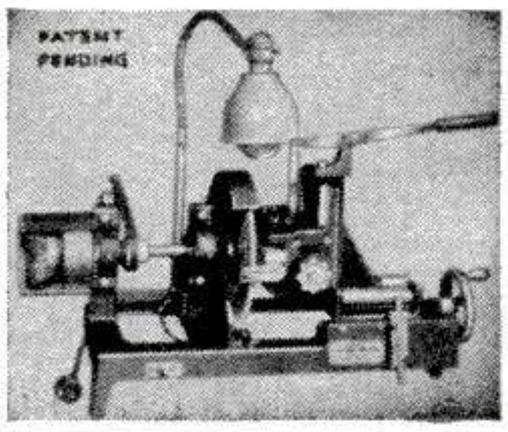


Locksmithing AND KEY MAKING

Now Made Easy! Practical up-to-date course teaches you how to pick locks, de-code, make master keys, repair, install, service, etc. New self-instruction lesson for every handyman, homeowner, carpenter, mechanic, service station operator, fix-it shop, hardware dealer, gunsmith. 53 easy illustrated lessons. Full price only $4.95, postpaid; or C.O.D. plus postage. Satisfaction or refund guaranteed.

Complete course . . . now only $4.95

Nelson-Hall Co., Dept. FW-1
210 S. Clinton St., Chicago 6, Ill.



Start a NEW BUSINESS!

or Add to your present Repair Business

SHARPEN DULL PIPE WRENCHES
PIPE TAPS & DIES
"GUM" CIRCULAR SAWS
Also MOTOR DRIVEN ROTARY HONE

Write for Information

J. C. MOORE INDUSTRIES
Box S 276, Fredonia, Pa.

BUILD YOUR OWN

AIR CONDITIONERS

AND DEHUMIDIFIERS

FROM JUNKED REFRIGERATORS—FOR $15

For Home or Automobile

Why should you or your family suffer from the heat. Now you can live and ride in cool comfort. Send 50c for instruction booklet. Save up to $500.00. (Specify whether for home or car.)

W. SLACK, 3716A Belmont, Dept. 60, Chicago 18, Ill.

NOW! USE YOUR WILLYS OR DODGE AS BOTH A 2 and 4 WHEEL DRIVE

Enjoy 2-wheel drive pep, speed, extra mileage, performance—keep 4-wheel drive power and traction with WARN HUBS. Change 4-wheel to 2-wheel or back in seconds with fingertip control. Front end assembly stands still in 2-wheel drive—ends drag, stops shimmy, cuts front tire wear, increases gas mileage to 6 m.p.g. For Willys $69.00, Dodge $74.00 pr.; also Standard Hub for Willys $20.00, Dodge $23.00, Land Rover $24.00 pr.; Automatic Hub for Willys $120.00 pr., all ppd. Money back guarantee. Dealers or direct. Write for folder.

WARN MFG. CO., Riverton Box 6064-BD, Seattle 88, Wash.

Copyrighted material

TUBE FREE WITH EVERY TIRE AT NO EXTRA COST
LOW OVERHEAD—LARGE VOLUME SALES & SMALL PROFITS BRING YOU THESE "LOWEST PRICES" WINTER SPECIALS—WHAT GOOD IS A TIRE WITHOUT A TUBE?

WHY PAY MORE!

20 YEARS AT THIS ADDRESS AN ESTABLISHED POLICY OF CAREFUL SELECTION ASSURES YOU MANY HAPPY MILES. BE WISE—TRY ONE—YOU'LL BUY MORE! WE WELCOME COMPETITION. NO ONE CAN TOUCH OUR QUALITY & PRICE!

YOU GET WHAT WE ADVERTISE

GOOD USED TIRES—NOT RECAPS—NOT RETREADS
TAKE THE 10% DISCOUNT WE OFFER & PUT MONEY IN YOUR POCKET!
EVERYBODY MAY TAKE **10% off** ON EVERY TIRE

20 MONTHS WRITTEN GUARANTEE

600x16	$3.55	820x15	$4.95	600x20	$7.55	32x6(8)	$8.75
650x16	4.25	700x15	3.95	650x20	7.65	32x6(10)	10.75
700x16	4.45	670x15	4.05	700x20	8.85	900x20	13.25
650x15	3.85	710x15	4.35	750x20	8.55	1000x20	14.02
760x15	4.45	550x17	3.75	825x20	14.15	1100x20	16.85

Specialists in Truck Tires—Selected for Toughest Jobs—Tops in Value

32 MOS. WRITTEN GUARANTEE				34 MOS. WRITTEN GUARANTEE			
600x16	$5.05	475x19	$5.15	700x15(6)	$8.45	700x20	$10.65
600x16(6)	6.35	640x15	4.75	750x16(8)	8.45	750x20(10)	13.05
650x16	5.55	670x15	5.15	700x17	8.75	750x20(8)	12.65
650x16(6)	7.05	710x15	5.25	750x17	10.55	825x20	17.55
700x16	6.15	760x15	5.75	750x15	10.45	900x20	17.65
750x16(6)	8.35	800x15	6.05	825x15	10.45	1000x20	16.55
550x18	3.95	820x15	6.15	600x20	8.75	1100x20	17.05
550x17	4.25	670x16	5.05	650x20	9.55	1100x22	17.95
650x15	5.05	760x15	7.05	32x6(8)	10.52	1000x22	17.95
700x15	5.15	700x16(6)	7.15	32x6(10)	12.95	1100x24	22.95
ALL WHITE WALLS $1.00 EXTRA (Military Treads)						750x20	14.05

Thousands of tires shipped all over the U.S.A. All tires shipped F.O.B. Phila. Send Check or M.O. with this ad—Dept. 5—No C.O.D.

STANDARD 834 N. Broad St., Philadelphia 30, Pa.

Tiny Telescope gives "CLOSE-UPS" FROM MILES AWAY

ONLY $3.95 TAX FREE

A Powerful telescope yet the size of your thumb! Conceals completely inside palm of hand! A revolutionary German made optical achievement. Precision easy-slide operation. Scientifically ground lens provide Brilliant Illumination, sharp detailed images. Lustrous ALL CHROME with black trim. An all purpose performer . . . instant focusing from 2 feet to infinity! NOT A TOY! *Case 50c extra.*

NO RISK TRIAL OFFER. If not 100% satisfied after 10 Day Trial return for full refund. Cash orders $3.95 postpaid. (C.O.D.'s $4.51)
UNITED BINOCULAR CO., 9043 S. Western, Dept. PT-203, Chicago 20.
DEALERS WANTED

TASOPE PHOTO-ENGRAVING PLANTS

MATERIAL COST OF THIS CUT 3/4¢ SELLING PRICE $1.00 AND UP

Establish your own profitable PHOTO-ENGRAVING business. Make cuts for newspapers, printers, and advertisers. Make etched name plates, plaques etc. Instructions furnished, no experience necessary. Sold direct from factory since 1931. First five hundred cuts sold locally or by mail will pay for plant and pay you well for your time. Write for FREE catalog.

TASOPE DEPT. PS-6, AURORA, MO.

NOW you can learn SPANISH AT HOME

by our proven RATIONAL System—the easiest way to learn quickly PRACTICAL Spanish, as pronounced and used in Latin America. Forget the grammar; it is like reading an absorbing story. Low tuition cost.

NORTH AMERICAN SCHOOL—HOLLYWOOD

SEND FOR FREE BOOK—NO OBLIGATION

North American School, Dept. PS-1.
Box 27606, Hollywood 27, Calif.
Send me information on your famous Rational System
Name.....
Address.....
City.....Zone....State.....

PROVEN SAVINGS FOR CAR OWNERS!

Motor Vehicle Research, Inc. PROVED

Automotive
LIQUI-MOLY®
ANTI-FRICTION ENGINE PLATING

Saves 56% ON OIL
Saves 17% ON GAS
SAVES ENGINE WEAR

- Protects against engine seizures
- Reduces engine temperatures
- Prevents dry starts

Easy to use...
ADD ONE CAN TO MOTOR OIL TODAY!

LIQUI-MOLY coats all engine friction-surfaces with a protective anti-friction metal plating of slippery Molybdenum Disulfide. Your engine gains new smooth gliding power—not possible with oil alone. Proved in millions of cars, trucks, buses and tractors.

At gas stations, auto supply stores, etc.

MAIL ORDERS ACCEPTED
if your dealer does not yet have LIQUI-MOLY.

COMPLETELY GUARANTEED
MOLY MOTOR PRODUCTS CORP.
Dept. M 1155 Broadway, New York 1, N.Y.
Please send me:
_____cans **$1.50** size LIQUI-MOLY ..... $_____
_____cans **$3.75** size LIQUI-MOLY ..... $_____
_____tubes **$1.25** size GEARLUBE BOOSTER for transmissions and differentials ... $_____
Add 15c for postage and handling..... $ .15
FREE WITH EVERY ORDER: 16 Page Booklet on "How to Get Out of Trouble on The Road" $_____ Total
Name_____
Address_____
City_____Zone_____State_____
(No C.O.D. Send cash, check or money order)

Copyrighted material

AMMUNITION

for a fraction of regular cost

Reload a whole carton for the cost of a few rounds of factory ammunition. Shotgun shells, rifle and pistol cartridges can be reloaded safely and easily with an inexpensive set of famous IDEAL Reloading Tools. *Send for free literature.*

THE LYMAN GUN SIGHT CORP.

690 West St., Middlefield, Conn.

NEW TOWELS

LARGE SIZE 12 for $1

Assorted pastel colors. Surplus stock from mid-western mill. Terrific values — you've got to see to believe. Money-back guarantee. Order now.

TOWEL KING, Dept. SA6

P. O. Box 6831 • Cleveland 13, Ohio

Treasure Chest of Ideas for Home Workshoppers!

NEW POPULAR SCIENCE 512-PAGE MAMMOTH HOME WORKSHOP MANUAL

ONLY $2.98!

Wonderful treasury of "how-to" projects for the man who likes to do things! Giant 512-page volume shows you how to save money—get more pleasure from your home workshop. Make handsome furniture, home accessories, gifts, toys. Build utility cabinets, racks, shelves, doors, etc. Work with wood, plastic, metals. You'll find hundreds of illustrations, scores of inside tips from Popular Science's trained experts!

Make This Giant Manual a Permanent Addition to Your How-To Library!

There's enough material in this one book for years of practical, enjoyable, inexpensive projects. And you can have this perfect workshop companion for only $2.98! So make sure of getting your copy. Today—RIGHT NOW—send $2.98 (we pay postage) or ask us to send c.o.d.

Popular Science, Dept. 654, 353 4th Ave., N. Y., N. Y.

MAIL COUPON NOW

PREPARE FOR BETTER JOB, BIGGER PAY IN SPARE TIME AT HOME

Today, choose the job you want—and prepare for it in time you might otherwise waste. Or if you are already in the work you like best, start training now for quicker promotion and increased pay. During more than 50 years AMERICAN SCHOOL has helped ambitious people to reach higher goals. Check subject that interests you and mail coupon for full information.

AMERICAN SCHOOL, Dept. GA46, Drexel at 58th, Chicago 37, Ill.

Without obligation, please send FREE and postpaid, full particulars about the subject checked below.

- ☐ Accounting
- ☐ Air Conditioning
- ☐ Architecture & Building
- ☐ Automotive Technician
- ☐ Better Foremanship
- ☐ Bookkeeping
- ☐ Business Management
- ☐ Contracting
- ☐ Diesel Technician
- ☐ Drafting—Building Trades
- ☐ Drafting—Machine Trades
- ☐ Electrical Engineering
- ☐ Electricity—Practical
- ☐ Electronics—Industrial
- ☐ High School Courses
- ☐ Machine Shop Operations
- ☐ Mathematics & Slide Rule
- ☐ Mechanical Engineering
- ☐ Plastics Engineering
- ☐ Plumbing—Practical
- ☐ Private Secretary
- ☐ Refrigeration
- ☐ Retail Merchandising
- ☐ Salesmanship—Outside
- ☐ Sheet Metal Work
- ☐ Tool Making

NAME.....

HOME ADDRESS.....OCCUPATION.....

CITY.....STATE.....AGE.....

Don't let a premature "SPARE TIRE" make you look old!

Many a hard-working man develops a "pot" and looks old *before his time.* Not because he's truly fat or because of middle age. The reason is—his back and stomach muscles are constantly strained and tired and no longer support him properly. If that's your trouble, you can . . .

Look trimmer instantly!

Bracer Supporter Belt is the answer. Not a girdle or abdominal belt, Bracer is a *man's* garment. Supports back and stomach muscles firmly, healthfully. Helps pull your stomach back to its *natural* position. Lets you stand straighter, taller. And helps you . . .

Feel better, too!

Bracer takes the strain off overworked muscles, helps you work better, feel less tired. Bracer is made of cool, elastic cotton. Tube-weave leg straps can't curl or bind. Attached or detachable pouch models—each with convenient fly front. $3.95 and up at drug, men's wear, surgical supply stores. Get your Bracer today!

FREE BOOKLET For additional facts, write today for free booklet, "What a Man Needs to Feel Better, Look Better," Bauer & Black, 309 W. Jackson Blvd., Chicago 6, Ill., Dept. PS-6

Bracer®

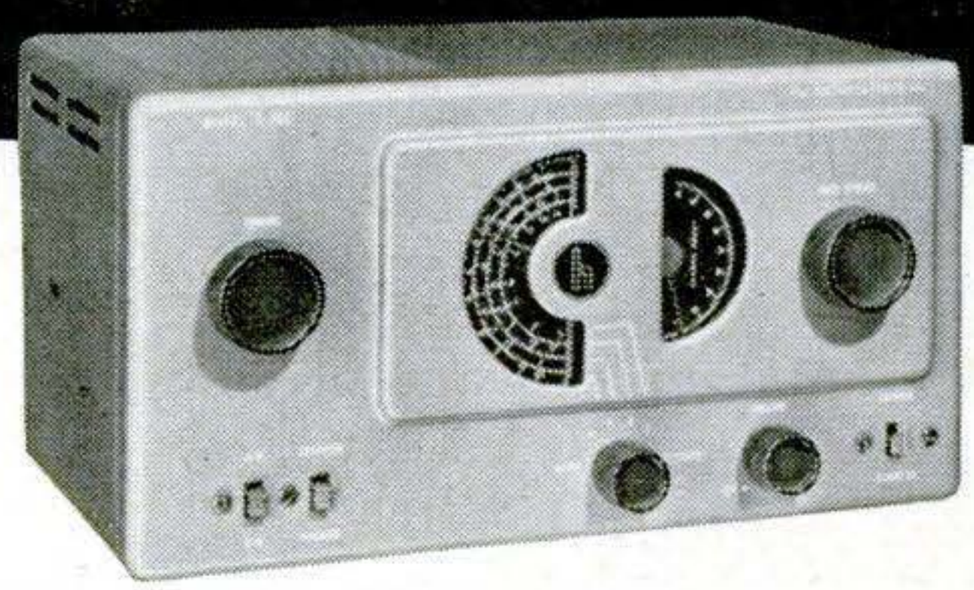
SUPPORTER BELT

Made by Bauer & Black Division of The Kendall Co.

Copyrighted material

ARE YOU MISSING THE BIGGEST THRILLS IN RADIO?

Get a hallicrafters Short-Wave and Hear it All!



You don't know how exciting radio can be until you've listened to today's short-wave. You hear stations from all over the world—broadcasting both in their own languages and English—mostly English. You hear ships at sea, planes in the air, police and military broadcasts that trigger tomorrow's headlines. You hear London, Paris, Rome, Rio—Moscow propaganda and our answers to it on the Voice of America. And plenty more!

Hallicrafters is by long odds the leader in the short-wave field. An unmatched record of dependability with amateurs, plus 20 years' experience in producing vital military radio communications equipment, stand back of every receiver sold under the Hallicrafters name. See your dealer today. Hear a Hallicrafters—and you'll choose a Hallicrafters!

FAMOUS HALLICRAFTERS S-38C—Most popular communications-type receiver in the world! Has electrical bandspread tuning to separate crowded stations. High gain circuit pulls in stations from all over the world. You hear five wave-bands. Regular broadcast plus 540 kc to 32 mc. Operates on regular 110 V AC/DC. **Only $49.95**

hallicrafters

The Name Is Famous

Radio • Television • High Fidelity

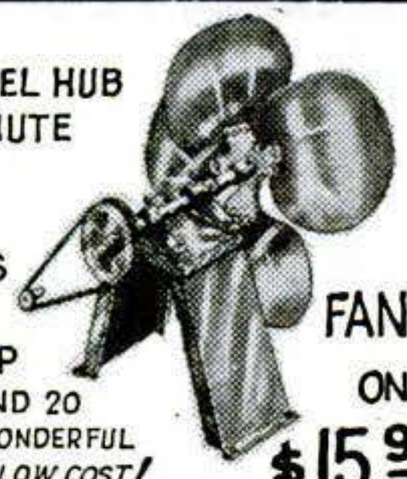
4401 West Fifth Avenue, Chicago 24, Illinois • Hallicrafters Ltd., 51 Camden Street, Toronto, Canada

---

MACHINED PARTS READY TO ASSEMBLE

DO IT YOURSELF **MODEL 120 FAN KIT** DO IT YOURSELF

- FOR HOME - FARM - SHOP!
- 20" ALUMINUM BLADE WITH STEEL HUB
- 4840 CUBIC FT. OF AIR PER MINUTE
- RUBBER MOUNTED BEARINGS
- COMPLETE V BELT DRIVE
- STEEL FAN SHAFT & COLLARS
- ALL HARDWARE TO ASSEMBLE
- ALL YOU NEED IS ANY ¼ TO ½ HP 1725 RPM MOTOR A SCREW DRIVER AND 20 MINUTES TIME TO ASSEMBLE THIS WONDERFUL HOME OR SHOP FAN KIT *QUALITY AT LOW COST!*
- 28x24x11½ WINDOW KIT BOX JUST SAW & NAIL - FITS MOST WINDOWS (INSTRUCTION SHEET INCLUDED) $5.95 F.O.B. PLANT



FAN KIT ONLY $15.95

Send Check or M.O. F.O.B. Plant - 14 Lbs. 25% Deposit on C.O.D. DEALER INQUIRIES INVITED

A.E. BOGG MACHINE & TOOL COMPANY 811 JEFFERSON ST. JEFFERSON CITY, MO. Dept. PS-6

MAKE EXTRA MONEY **PLASTICS** LEARN AT HOME

LEARN HOW TO MAKE fast-selling PLASTIC NOVELTIES FURNITURE JEWELRY SIGNS TOYS LAMPS

There are RICH OPPORTUNITIES for MEN and WOMEN with "know-how" in Plastics. Interstate's new Plastics course tells and shows how to make hundreds of fast selling items out of Plastics. Gives complete training in fabrication, casting, lamination, molding, internal carving, etc., in simple, easy, step-by-step language and pictures. Plastics and Fabricating Kits for 23 valuable Plastic items come with training at no extra cost. START A PLASTICS BUSINESS OF YOUR OWN. No other industry holds such promise for the future. You can make big money manufacturing novelties, toys, signs, etc., in your own home in spare or full time. Don't wait! Learn NOW how Interstate's Plastics Training qualifies you for success in the Plastics field.

WRITE TODAY!

PLASTICS AND SUPPLIES FURNISHED FOR 23 VALUABLE PROJECTS

INTERSTATE TRAINING SERVICE

Dept. C-2F Portland 13, Oregon

Smarter Low-Cost Boating

NOW ONLY 95.– UP

1 to 4 seaters, paddling, yacht-smart sailing, quieter motoring 1 to 10 HP

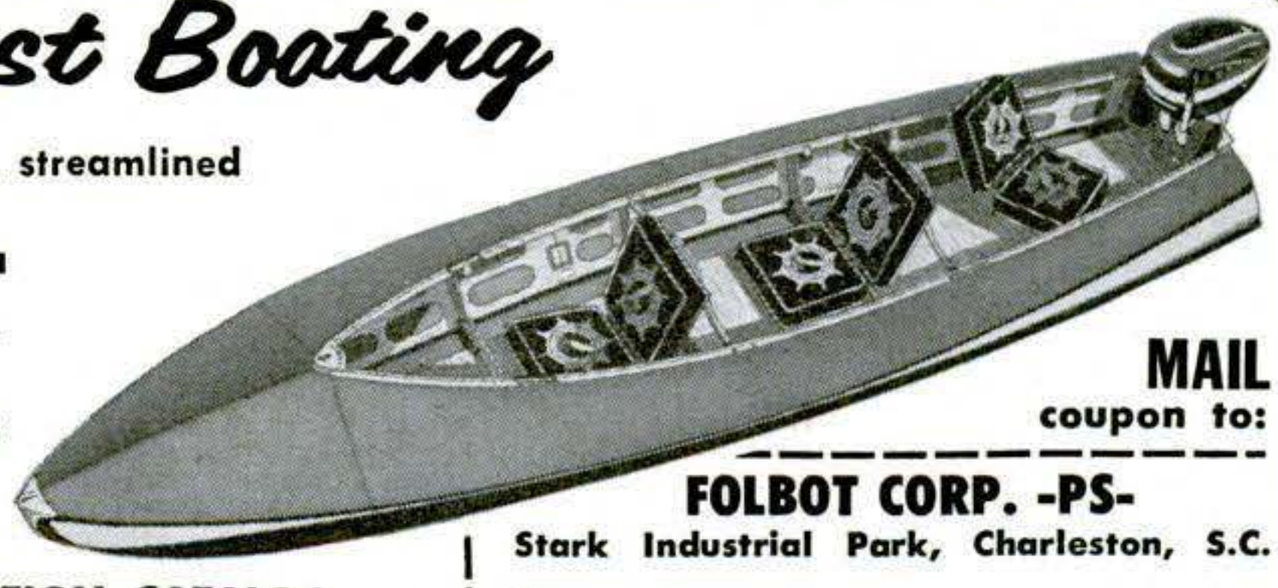
Your steadier, sturdier, streamlined Travel Craft Supreme

FOLBOT

for

EASIER FISHING

Better Hunting



ACTION CATALOG **FREE**

MAIL coupon to:

FOLBOT CORP. -PS-

Stark Industrial Park, Charleston, S.C.

Name: _____

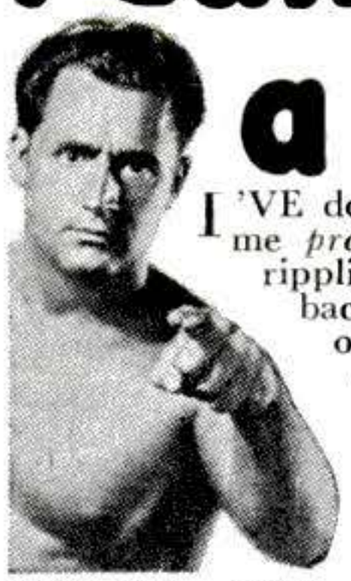
Address: _____

City: _____ State: _____

Copyrighted material

LET ME PROVE

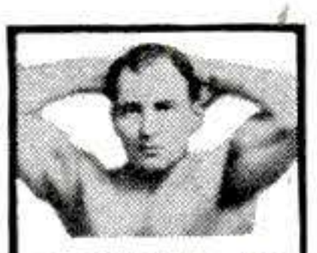
I Can Make YOU a New Man!



Charles Atlas— winner of title "World's Most Perfectly Developed Man"

I'VE done it for thousands of other fellows. Let me *prove* I can add solid inches of handsome, rippling muscles to YOUR arms, legs, shoulders, back . . . make *you* an outstanding specimen of strength and self-confidence. My secret of *"Dynamic Tension"* does it in just 15 minutes a day. You'll be amazed at the results and so will your friends.

FREE—My 32-Page Illustrated Book Is Yours—Not for $1 or 10c—But FREE



5 INCHES OF NEW MUSCLE "My arms increased 1½"; chest 2½"; forearm ⅞"." C. W., W. Va. "Have put 3½" on chest (normal) and 2½" (expanded)." F. S., N. Y.

32 pages packed with valuable advice, actual photographs of fellows who became new men almost overnight . . . with *"Dynamic Tension."* Book can mean turning point of your life. It's yours—ABSOLUTELY FREE. Send for it TODAY. Address me personally. **CHARLES ATLAS, Dept. 1F, 115 East 23rd Street, New York 10, N. Y.**

CHARLES ATLAS, Dept. 1F
115 East 23rd St., New York 10, N.Y.

Send me—absolutely FREE—your famous book, "Everlasting Health and Strength"—32 pages, crammed with photos, answers to vital questions, valuable advice. I understand book is mine to keep, and sending for it does not obligate me in any way.

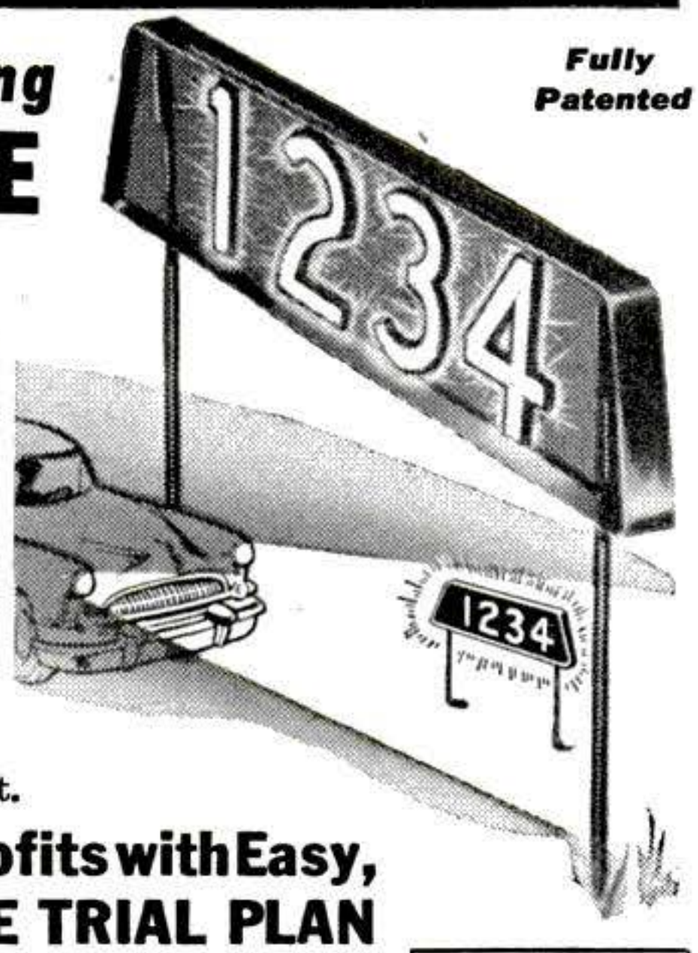
Name _____ Age _____
(Please print or write plainly)
Address _____
City _____ State _____

New Money-Maker!

Light-Reflecting

CURB-SIDE HOUSE NUMBER

Fully Patented



Fastest seller in years! A smart-looking house number by day . . . and at night thousands of tiny lenses on each number sparkle and reflect light from auto headlights, streetlights, etc., making numbers easy to read on darkest night.

Sensational Profits with Easy, Sure-Fire FREE TRIAL PLAN

Thousands of home-owners say "Yes, we'll keep it" when you set up this handsome NiLite **Light-Reflecting** Curbside House Number. Every area in America is awaiting "gold mine" of profits for men who get started NOW. Amazingly low priced—yet $40.00 in a day and more is easy with unique, effective FREE TRIAL Plan which sells 8 out of 10 homes. We show you how to make money selling on your own, getting others to sell for you, and cleaning up with Fund Raising Plan used by churches, clubs, scouts, and other organizations. Rush your name and your address for full details, sent FREE. Write TODAY.

DISTRIBUTORS
A real bonanza! Rich, unworked territories open for topmen. Write!

NiLITE SIGN CO., 173 W. Madison Street, Dept. J-81. Chicago 2, Ill.

IDEAL LAWNMOWER SHARPENER

BOOST YOUR INCOME

You can earn extra cash with the Model 300 Ideal Lawnmower Sharpener. Used and recommended by leading manufacturers and service shops, the Ideal has everything you need, nothing else to buy. Grinds reel and bed knife, also reconditions. Get started now in this highly profitable business. Write for catalog today.

The FATE-ROOT HEATH Co.
Dept. PS-6, Plymouth, Ohio

UPHOLSTERY

BE YOUR OWN BOSS

"Learn-by-Doing" at home—earn EXTRA CASH in spare time. Get a better job—be your own boss. UTS Course teaches professional furniture upholstery, re-upholstery, slipcovers, drapery making. No experience needed! **FREE**—tools, frames, materials, fabrics to make 3 beautiful pieces upholstered furniture and slip covers worth over $239.

Write for FREE Illustrated Book. Upholstery Trades School, Dept. CH-1609, 721 Broadway, New York 3, N. Y.

LEARN LOCKSMITHING

Learn this fascinating, profitable trade from experts in your spare time at home!

Age or physical handicap no disadvantage. Year around, steady income. Full or part time. Practical, illustrated lessons. You can make money even while learning! All materials and special tools supplied without extra charge.

LOCKSMITHING INSTITUTE, Dept. PS-54
15 PARK AVENUE RUTHERFORD, N. J.
Lic. by N. J. State Board of Education
Approved for Veterans

BUY IT

WHOLESALE!

GET UP TO 40% OFF

☆ Start a Buying Service at Home, SPARETIME. GET BIG-NAME MERCHANDISE FOR SELF AND CLIENTS UP TO 40% LESS THAN REG. PRICE. SALES EASY, AS YOU CAN GIVE SIZEABLE DISCOUNTS, STILL MAKE FAT COMMISSIONS. *Post Card brings FREE COPY "The Wholesale Plan".*

FREE! "THE WHOLESALE PLAN"

American Buyers Service

■ 631-SP LINDEN AVE., BUFFALO 16, N. Y. ■

ILLUSTRATED CARTOON BOOKLETS

Men, here are the small illustrated cartoon booklets of comic characters they're talking about. 20, all different, (and other offers) sent for $1 postpaid. No C.O.D.

GAY SALES, 448-L N. Prior, St. Paul, Minn.

BOOST YOUR EARNING POWER WITH DIESEL

Train Now For This Big Pay Trade!

Are you mechanically inclined? **Then you'll like DIESEL!** You'll like working on these modern engines . . . pulling down the big pay of DIESEL-TRAINED men. Train at home for Diesel opportunities with simple, practical UEI Training. Learn DIESEL engine operation, fuel systems, repairs, maintenance PLUS Scientific Motor Tune-up. Course includes shop training in our big, well-equipped shops, working on Diesel engines. Write now for FREE booklet!

UTILITIES ENGINEERING INSTITUTE (Founded 1927)
2521 Sheffield Avenue, Dept. DM-32, Chicago 14, Illinois

Copyrighted material

GIANT BALLOONS

Surplus U.S. Gov't. (new—overage) Neoprene weather, target balloons. For **FUN** or **PROFIT.** Great sport in the backyard; or for parties, picnics, dances, fairs. **MONEY-MAKERS.** Use these balloons to attract crowds to civic events, conventions, exhibitions, trade shows. **TERRIFIC** for high school and college **PROMS.** All sizes are approx. inflated sizes. We pay postage on prepaid orders.

3 ft. dia. 49c—6 ft. dia. 99c
13 ft. dia. $1.59—20 ft. dia. $1.95

"Marksman" AIR PISTOL

It's a target pistol but it looks, feels, muzzle loads and cocks like an army .45. You can have fun indoors in rumpus room or basement: or out in the back yard or woods. Make it a test of skill and "outmarksman" your friends. Caliber .177, accurate, high-powered, guaranteed. Complete with free supply of BB's, darts & pellets. Full payment must accompany order. **$5.95**

EXTRA AMMUNITION AVAILABLE
Darts, **50¢** doz.—BB's, **15¢** for 150—Pellets, **$1.50** for 500
Add 10% for handling & delivery of air pistol and ammunition
Calif. residents please add sales tax on all items

WAR ASSETS DIV. VOLUME SALES CO.
Dept. S-6-54 3930 Sunset Blvd. Los Angeles 29, Calif.

LEARN TO MOUNT BIRDS

ANIMALS, FISH, PETS

Be a Taxidermist. Save your hunting TROPHIES. Have a fine home-museum. Hunters, save and **MOUNT** your beautiful DUCKS, QUAIL, DEER, **TAN** skins, FURS. **Great Fun.** Spare-time **PROFITS.**

FREE BOOK Tells ALL about it. 100 fine wild-game pictures, 48 pages. SEND TODAY, don't delay. Get this WONDERFUL **FREE BOOK,** MEN AND BOYS. Learn Taxidermy. Double your hunting pleasure. Rush letter or **POSTAL** today. **STATE YOUR AGE.**

N. W. SCHOOL OF TAXIDERMY, Dept. 2606, Omaha, Neb.

Learn TELEVISION RADIO—ELECTRONICS

TRAIN IN 10 MONTHS OR LESS

Prepare in spare hours for good pay in Television, Radio and Electronics. Train at home with Frank L. Sprayberry, America's outstanding Radio instructor. Big Kits of Equipment furnished. Build testers, sets, etc. Rush name and address for details and 2 BIG RADIO BOOKS—**ALL FREE!** No salesman will call. Write today!

Sprayberry Academy of Radio, Dept. 55-K
111 N. Canal Chicago 6, Illinois

Secrets of VENTRILOQUISM Now Revealed!

Easy to learn in 60 to 90 days with our Home Study Course. **RESULTS GUARANTEED.** Make Money! Be Popular! Have Fun! Big Opportunity! Radio, Television, Stage Appearances! For Free Information regarding price and terms, WRITE. You must state your age. Dummy Catalog 25c.

FRED MAHER SCHOOL OF VENTRILOQUISM
Box 36, Studio PS-F Kensington Station
Detroit 24, Michigan

Now! Modernize Your Home & Save $$

AMAZING NEW GLASS JALOUSIE WINDOW
100% VENTILATION-WEATHERPROOF
EASY TO INSTALL YOURSELF, QUICKLY

Complete with Aluminum Frame, Glass, Operator & Removable Screen—Rustproof—Guaranteed

The window that works like a venetian blind. Cool in summer—warm in winter. Safe & Clean.

WINDOW DIMENSIONS—WIDTH BY HEIGHT

A— 18x25	$13.98	H— 36x25	$16.49
B— 18x37⅜	15.77	K— 36x37⅜	18.75
C— 18x49⅝	17.66	L— 36x50⅝	21.50
D—25½x25	14.44	M— 36x62	23.95
E—25½x37⅜	16.09	N—52⅛x37⅜	26.50
F—25½x50⅝	17.75	P—52⅛x37⅜	28.95
G— 18x62	19.25	T—52⅛x50⅝	35.00

Fool-Proofed Packed—Send Ck. or Money Order—Orders Rushed
BLATT, 2827 N. W. 7th Ave., Miami, Fla.

SAVE OIL and ENGINE WEAR with this LONG QUART

This 100% Pennsylvania motor oil with THE *Tough-Film* stands up under intense heat, resists formation of oil-wasting engine deposits. Your engine stays clean, smooth-running, *uses less oil.* And because Pennzoil *lasts* so long, it guards against costly wear caused by acids and friction. Switch to Pennzoil *now!*

As big a difference as ever!

Most motor oils now contain detergents. A detergent's job is not to lubricate, but to improve conditions under which oil lubricates. Pennzoil, too, contains detergents, but its basic lubricating quality, resulting from superbly refined Pennsylvania crude, still provides an *extra* margin of safety.

Sound your Z at this sign...

SOUND YOUR Z
100% Pure Pennsylvania
PENNZOIL
Safe Lubrication

© 1954, The Pennzoil Co.
Member Penn Grade Crude Oil Assn., Permit No. 2

BETTER DEALERS IN EVERY STATE FEATURE PENNZOIL® MOTOR OILS & LUBRICANTS

Copyrighted material

You Can Play

. . . even if you don't know a single note of music now!

IMAGINE! Even if you never dreamed you could play . . . you can soon surprise your friends with your musical ability. No special talent or previous training needed. Spend just a few minutes a day—and only a few cents per lesson. Teach yourself to play piano, guitar, accordion, whatever instrument you choose. Make amazingly rapid progress because **you start right out playing real pieces by note.** No boring exercises to do. Over 900,000 people have chosen this easy home study method.

SEND FOR FREE BOOK

Mail coupon for 36-page illustrated FREE BOOK. No obligation; no salesman will call on you. **U. S. SCHOOL OF MUSIC, Studio 156, Port Washington, N. Y.**

(56th SUCCESSFUL YEAR)

U. S. SCHOOL OF MUSIC
Studio 156, Port Washington, N. Y.

Please send me valuable illustrated Free Book. No obligation.

I'm interested in playing (name instrument) .....

☐ I do ☐ I do NOT—have instrument now.

Name .....
(please print)

Address .....

Do-It-Yourself LUMBER CATALOG

FEATURING AMERICA'S FINEST FURNITURE AND CABINET LUMBER FOR THE HOME SHOP CRAFTSMAN

Now you can buy your "Do-It-Yourself" Lumber in small quantity orders of $20 or more. Send for new 32-page, net price catalog which contains detailed information on 16 species of Furniture Lumber, Plywood, Dowels, Turning Squares, etc., as used by the home craftsman.

● ***For complete catalog, send 15c to cover handling and mailing costs. Mimeographed Price List sent free.***

HARDWOOD CORPORATION OF AMERICA

E. L. DIVISION
Box 1091, Dept. S
Asheville, N. C.

I enclose 15c for "Do-It-Yourself" lumber catalog.

Name _____

Address _____

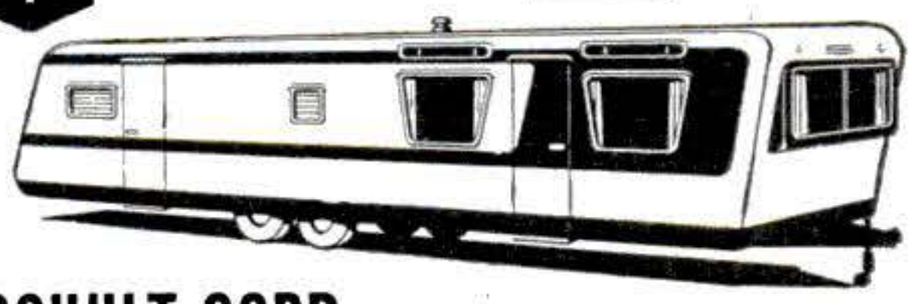
City _____ Zone _____ State _____

A BIG-VALUE HOME!

You get *most* for your money in a roomy, convenient, furnished and equipped Schult. Insulated for all-season family comfort. Quality, value famed for 20 years! Find out...

SCHULT

SEND FOR FREE FOLDER



SCHULT CORP. DEPT. 3106 ELKHART, IND.

ASSEMBLE YOUR OWN **DIVING LUNG**

Save 50% or more! We furnish the parts and instructions. Complete outfits $39.95 and $49.95. Write for descriptive literature.

COMPLETE PORTABLE
OXYGEN RESUSCITATOR

Ideal for Ambulances, Home Therapy, Clinics, Fire Dept., Police, etc. $49.95 and $59.95. Write for literature.

FREE Catalog! Underwater swimming equipment. Write today!

Ed. Aguado Trdg. Co., Dept. J
Box 4525 Plaza Sta., St. Louis, Mo.

learn to HYPNOTIZE!

Command others with hypnotic power! everyone with your new spellbinding technique. New easy to master course teaches you this mystic art, quickly, expertly, professionally. Have subjects at your mercy. Make them obey your every desire. Send for this Valuable Book Now! Just pin $1 to this ad and "2 lessons in Hypnotism" will be mailed to you postpaid. Satisfaction guaranteed or your money back.

BOOKS PUBLISHING CO., Amityville, N. Y.

ANALYZE HANDWRITING

MORE INCOME... MORE PRESTIGE AND MORE SUCCESS!

FASCINATING, uncrowded profession-business, full or spare time. Free illustrated lesson and yearbook shows how men and women in home and business find opportunity in analyzing handwriting. *Understand People—Make Money.* Free lesson and information about amazing opportunities if over 21.

I. G. A. S., Inc., 900 Wilhoit Building, Springfield, Missouri

BUILD YOUR OWN FAN

One-piece cast aluminum propellers for cooling and ventilating.

Size Inches	Polished 2 Blade	Polished 3 Blade	Unpolished 2 Blade	Unpolished 3 Blade	Bore Inches
15	$3.00	$4.00	$2.50	$3.00	1/2, 5/8, 3/4
18	3.75	5.00	3.00	4.00	1/2, 5/8, 3/4
20	4.00	5.50	3.25	4.50	1/2, 5/8, 3/4
24	4.50	6.50	4.00	5.50	1/2, 5/8, 3/4

Write for pamphlet on larger fan blades, wire guards, fan bases, shutters, pillow blocks, exhaust fan frames, etc. Dealers write for discount. Add 10% for packaging and shipping. Shipped C.O.D. or cash with order.

KLOPPENBORG ALUMINUM FDY., Dept. PS-54, Davenport, Iowa

AIR CONDITION
ONE TO THREE ROOMS
FOR ONLY $26

Evaporative air conditioner easily assembled in minutes with screw driver, pliers. Heavy duty, rust resistant. Adjustable louvers direct air. Powerful 1/25-hp, 115-v AC shaded pole motor. Balanced fan. Rocky Mountain aspen filters. Clog-free drip trough. Adjustable side panels for snug, easy window-fit. Brass metering valve, toggle switch, pipe connection, 25' tubing. Send $5.00 m.o. or check; balance C.O.D. plus shipping. Pay full amount; save shipping costs. Supply limited — ACT NOW!

WEATHER MERCHANTS
2913-B Gaston Ave.
Dallas 4, Texas

MOTOR GUARANTEED FOR ONE YEAR

Copyrighted material

BRAND NEW! Firestone TIRES

SAVE UP TO 50%

SEND FOR FREE CATALOG

BRAND NEW—FIRST QUALITY FIRESTONE PASSENGER TIRES

All Tires Carry Famous Firestone Unconditional Guarantee

BRAND NEW—FIRST LINE—HEAVY DUTY FIRST QUALITY—SENSATIONAL VALUES

TRUCK TIRES

Size		Full Price	Size		Full Price
700x15	6 ply	25.79	750x20	10 ply	50.42
600x16	6 ply	17.78	825x20	10 ply	58.50
650x16	6 ply	21.58	825x20	12 ply	69.73
700x17	6 ply	30.75	900x20	10 ply	70.55
600x20	6 ply	24.31	900x20	12 ply	83.84
650x20	8 ply	31.47	1000x20	12 ply	89.27
700x20	8 ply	35.45	1100x20	12 ply	104.78
700x20	10 ply	42.48	1000x22	12 ply	94.08
750x20	8 ply	45.15	1100x22	12 ply	110.75
			1100x24	12 ply	115.10

BLACK WALL TIRES 4 PLY FULL PRICE

640 x 15	11.82
650 x 15	14.29
670 x 15	12.50
710 x 15	13.88
760 x 15	15.12
600 x 16	11.12
650 x 16	14.73

WHITEWALL TIRES
Special Brand New
(Factory Blemish)
First Line 4 ply Pass.

670 x 15	15.24
710 x 15	16.83
760 x 15	18.41
800 x 15	20.23
820 x 15	21.04

SUPER SPECIAL!
1st Qual. Armstrong
670 x 15 11.91

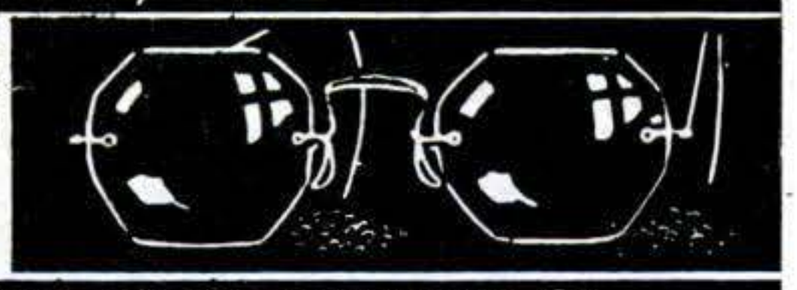
(Order by Mail—Send check or M.O.) • (all prices f.o.b. plant)
Farmers—Full line of tractor tires—Write for Prices

S & S TIRE CO. HADDON AND BRADLEY AVES. CAMDEN 3, N J.

EYE GLASSES by MAIL As low as $1.95

WRITE for FREE CATALOG with 14 LENS SAMPLE CARD

Thousands of Customers
Est. 1939



QUALITY READING-MAGNIFYING OR BIFOCAL GLASSES FOR FAR AND NEAR

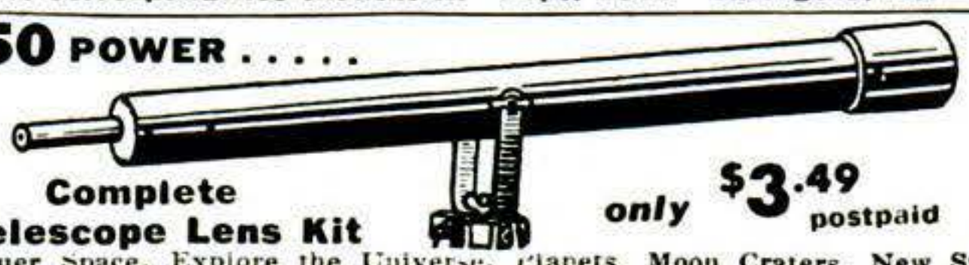
ADVANCE SPECTACLE COMPANY, Inc.
537 S. Dearborn St., Dept. SP-6 Chicago 5, Illinois

BECOME AN EXPERT IN TRAFFIC

Traffic men earn $4,000 to $10,000 and up. Thousands of firms need experts on rates, tariffs, regulations. We train you thoroly in spare time at home for executive traffic jobs. Personal training under traffic authorities. Placement counsel and help. Write for free 48-page book "Traffic Management—the Fast Growing Profession."

LASALLE Extension University, 417 So. Dearborn St.
A Correspondence Institution Dept. 683T Chicago 5, Ill.

250 POWER .....

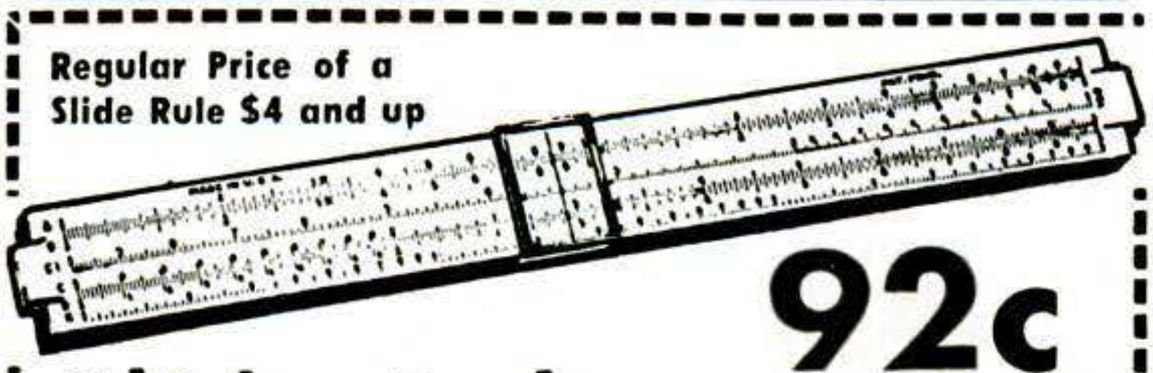


Complete Telescope Lens Kit only $3.49 postpaid

Conquer Space, Explore the Universe, Planets, Moon Craters, New Stars, etc. Complete Lens Kit consists of 80 inch focal length ground and polished objective lens, eyepiece lenses for 50 POWER, 100 POWER, 150 POWER, 200 POWER, 250 POWER, and all necessary lens fittings. Easy to make from simple step by step instructions. (Tripod and mount not included.) Money back guarantee.

BUSSE SALES CO., Hartford, Conn., Dept. PS-22

Regular Price of a Slide Rule $4 and up



92c

Slide Rule and this coupon
Add 8c Postage

If you can use a pencil you can use a slide rule

For bookkeepers, accountants, salesmen (figuring commissions, cost, etc.), farmers, housewives, etc. For Armed Forces highly important. Men's most useful tool. Easy to calculate instantly. Multiplying, proportions, division, roots, etc. "High Vision" Clear View Slide. Full 10" Rule, A, B, C, D, C1 and K scales.

FREE 28-page instruction book on how to get correct answers instantly without pencil or paper.

Gene Loewy, 545 5th Ave., Dept. 44-R, N.Y. 17

Limit three rules to each coupon

Lighten work on outside jobs...

Pointers on painting exterior walls: Make sure surface is dry and temperature between 55° and 90°. Remove loose paint with scraper or wire brush. Fill cracks and holes. Dust thoroughly. Select brush 3" to 5" wide and always . . .

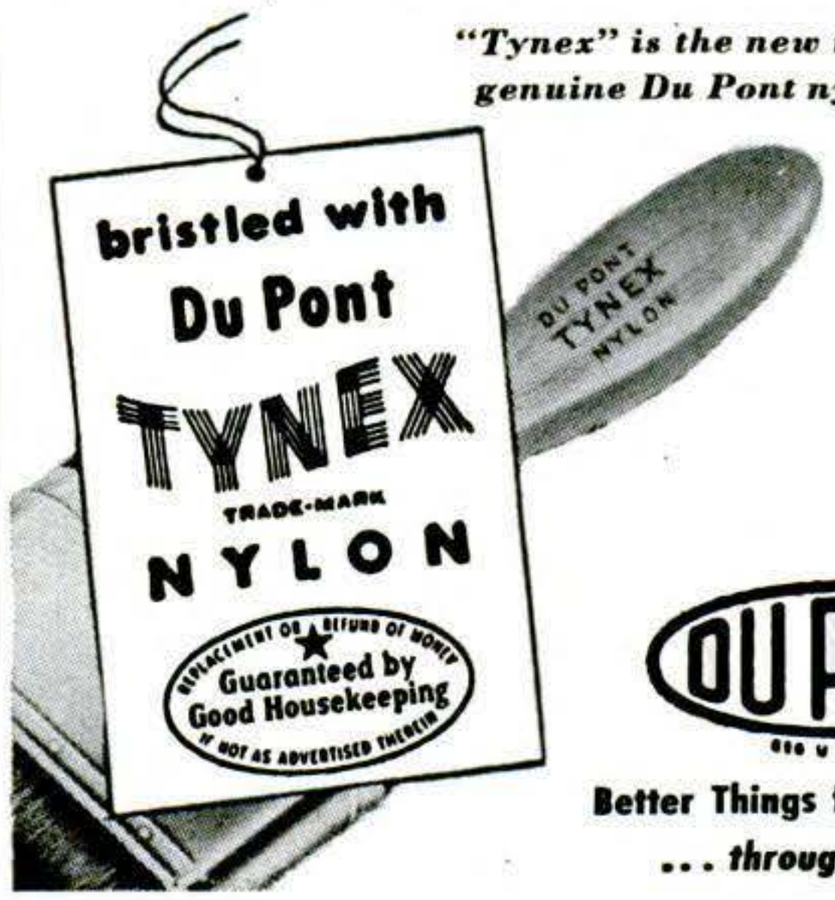
Use brushes with bristles of Du Pont TYNEX nylon

TRADE-MARK

YOU'LL find "Tynex" nylon bristles pick up a full load of paint every dip and brush it out easily in a uniform coat. Outside or in, brushes bristled with "Tynex" help you get work done fast. "Tynex" bristles simplify brush upkeep, too. They are quickly cleaned by any commercial cleaner and last up to five times longer than other bristles.

Send for free booklet on "How to Choose and Use a Paintbrush Bristled with 'Tynex' Nylon." Write: E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Dept. PS-6, Wilmington, Del.

"Tynex" is the new trade-mark for genuine Du Pont nylon bristles.



LOOK FOR "TYNEX" WHEN YOU BUY BRUSHES

DU PONT

Better Things for Better Living
... through Chemistry

Copyrighted material

TRAINED MEN NEEDED

BIG PAY—GOOD FUTURE

☐ TELEVISION ☐ ELECTRONICS
☐ DIESEL ☐ AUTO

WHY WORK FOR LOW PAY or risk being out of a job??? Usually the properly trained man has a steady job . . . through good times or bad. Even back during DEPRESSION there was a *big demand* for Bailey Trained men.

In only 5½ to 6 months we can train YOU to enter one of the big pay fields!

No previous experience or special education necessary. With our method of training you do not spend years pouring over books, figures, charts and graphs. You learn by rebuilding, repairing, testing and operating the most modern equipment, under the guidance of experienced, courteous and friendly instructors. This method of training gives you the experience and confidence required to step right into the big pay jobs without spending years as a mechanic's helper.

It's EASIER and COSTS LESS than you may think to get this residence shop training . . . we help you find part-time jobs while in school—full-time jobs after graduation. Check subject above in which you are interested and mail for complete information.

BAILEY Technical SCHOOLS
Veteran Approved
1632 S. Grand St. Louis 4, Mo.

NAME.....AGE.....
STREET.....
TOWN.....ZONE.....STATE.....

CONQUERS DAMPNESS AND WET

Stops Shorting-Out In Automotive, Electric, and Electronic Equip.

Stops Rust and Corrosion

Even thoroughly water-soaked equipment is back in service in a few minutes after a SPRADRI* application. One application prevents rust, corrosion, and future shorting-out for months. Also ideal for rust-proofing tools, instruments, guns and other sporting gear. SPRADRI's microscopically thin film will not affect accuracy or operation of precision equipment. Send $2.95 for 12 oz. Aerosol spray container.
*Patented

SPRADRI CO. (Chem. Div. of Perfecting Service Co.)

SPRADRI COMPANY, 334 Atando Ave., Charlotte 6, N.C.
Enclosed is check or money order for $ for Aerosol cans SPRADRI @ $2.95 each, postpaid. Also send literature giving many uses and advantages of SPRADRI.

Name_____
Address_____
City_____Zone____State_____

NEW Optical Radioactivity Detector GEIGERSCOPE

Now you can check mineral specimens for uranium without buying costly equipment!

Here is a remarkable new device for prospectors, engineers, experimenters, gadgeteers, everyone interested in atomic energy. With the Geigerscope you don't need an expensive electronic counter; sparkles of light indicate radioactive content. Major universities and Atomic Energy laboratories now using it find it more sensitive than a small G-M counter in determining radioactivity in mineral specimens. Sturdy, durable, portable as a pocket watch. The Geigerscope needs no battery or power source. Supplied complete with sample of uranium ore, carrying pouch and full directions. Full written guarantee. Order yours today! WRITE TO:

ONLY $1 postpaid

KEN RESEARCH, INC.
831 Fifth Avenue River Edge 4, N. J.

make your own Gems 29.50 F.O.B

The Gem Maker comes complete with all necessary equipment, including a super-charged diamond blade for sawing, and all wheels for grinding, shaping and polishing; also complete instructions. The complete equipment as shown, less motor and belt, for only $29.50, f.o.b. Burlington, Wisconsin. Write today for information and literature.

B & I MANUFACTURING CO.
Dept. S Burlington, Wis.

RAISE CHINCHILLAS MAKE MONEY AT HOME

YOU RAISE THEM—WE BUY THEM!

Small capital can show terrific profits in your spare time! Free booklet explains our new lease plan. Write Dept. 602

CHINCHILLA BREEDERS CORP.
248-02 NORTHERN BLVD., LITTLE NECK, N.Y.

FREE CRAFT CATALOG

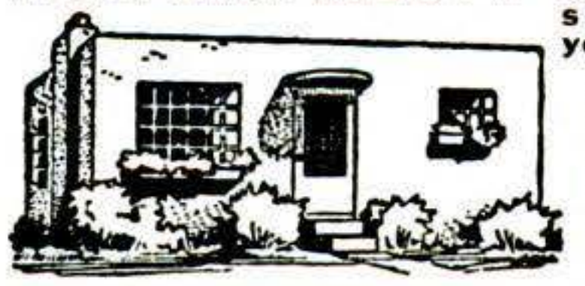
120 PAGES... Craft Supplies, Tools, Designs, Instruction Books from America's Largest, Most Complete Handcraft Stock.
Send for your free copy NOW!

GRIFFIN CRAFT SUPPLIES
5626-B Telegraph Ave. • Oakland 9, Calif.

$750 BUILDS 4 ROOMS & BATH!

WHY PAY RENT?

For Seven Hundred Fifty Dollars and 30 days of your spare time, you can build yourself this Beautiful Home.



Living room, 11x15, Front bedroom 9x11, Back bedroom 10x12, Kitchen 9x11, Bath 5x8, Hall 3x4, Windout steel casement windows, Concrete block, stuccoed, Step-by-step illustrated instructions, blueprint and material list. $1.00 ppd. No COD. Money back guarantee. **Economy Home, Box 645, Dept. D, Columbus 16, Ohio**

I'll Send You This Handsome SAMPLE CASE-FREE

and Show You How to Make Up to $30.00 in a Day

Mail coupon for this Free Tailoring Sample Case packed with 150 beautiful, big-value suit and overcoat fabrics. Take orders from friends, fellow-workers, others, for fine quality, made-to-measure clothes. Pocket big cash profits in advance. Because wearing our suits and overcoats brings more orders, we make it easy for you to get your own clothes without 1c cost. No experience is needed. SATISFACTION GUARANTEED. SEND NO MONEY. Just fill out and mail coupon—today!

PIONEER TAILORING COMPANY, Dept. L-1120
CONGRESS & THROOP STREETS - CHICAGO 7, ILLINOIS

Copyrighted material

Capra Gems

more dazzling than diamonds

FREE Booklet

Get full facts, FREE, on the most amazing discovery by modern science—CAPRA GEMS. *A miracle of science described in recent issues of Saturday Evening Post and Reader's Digest.* They're more dazzling than diamonds, yet cost much less. CAPRA GEMS' refractive quality is actually higher than diamonds! Brilliantly beautiful, dazzling CAPRA GEMS are hand cut, hand polished and hand selected . . . priced within the reach of all who love fine gems. A 1-carat diamond stone costs you approximately **$1000. A comparable choice selected, 1-carat CAPRA GEM is yours for $24, federal tax included . . . and can be bought in small easy payments.**

GET THE FACTS NOW

Valuable illustrated booklet shows a wide selection of men's and women's rings. Gives full details, including prices and settings . . . shows all CAPRA GEMS actual size. Limited supply, so send today without delay. No charge, no obligation. Get all the facts on CAPRA GEMS . . . more dazzling than diamonds.

SEND NO MONEY

CAPRA GEM CO., Dept. PS-6, P. O. 5145, Philadelphia 41, Pa.

SHORTHAND in 6 WEEKS

Famous SPEEDWRITING shorthand. 120 words per minute. No symbols; no machines; uses ABC's. Easiest to learn; write and transcribe. Low cost. 250,000 taught by mail. For business and Civil Service. Typing available. 31st year. Write for FREE booklet to:

Speedwriting®

Dept. 2606-4, 55 W. 42 St., New York 36

MEN PAST 40

Men afflicted with Bladder Trouble, Getting Up Nights, Pains in Back, Hips, Legs, Nervousness, Dizziness, Physical Inability and General Impotency send for our amazing **FREE BOOK** that tells how you may correct these conditions and have new health and Zest in Life. Write today. No Obligation.

Excelsior Institute, Dept. B-5, Excelsior Springs, Mo.

MORE For Your Money in a SHAW "DU-ALL"

New Low Prices
Walking Tractors $99.50 up
Riding Tractors $298.50 up

Improved design, better value in 1½, 2½, 3, 5 H.P. walking tractors. New, low cost, streamlined 2½, 5, 8 H. P. riding tractor. Inexpensive, new 1½ H. P. tiller that pulverizes up to 12 inch swath 6 inches deep, and less. Automotive gears on heavier models. Prices will please you. **FREE CATALOG.** Write today.

SHAW MFG. CO. 5706 Front St., Galesburg; Kans. 668PS N. 4th St., Columbus, Ohio

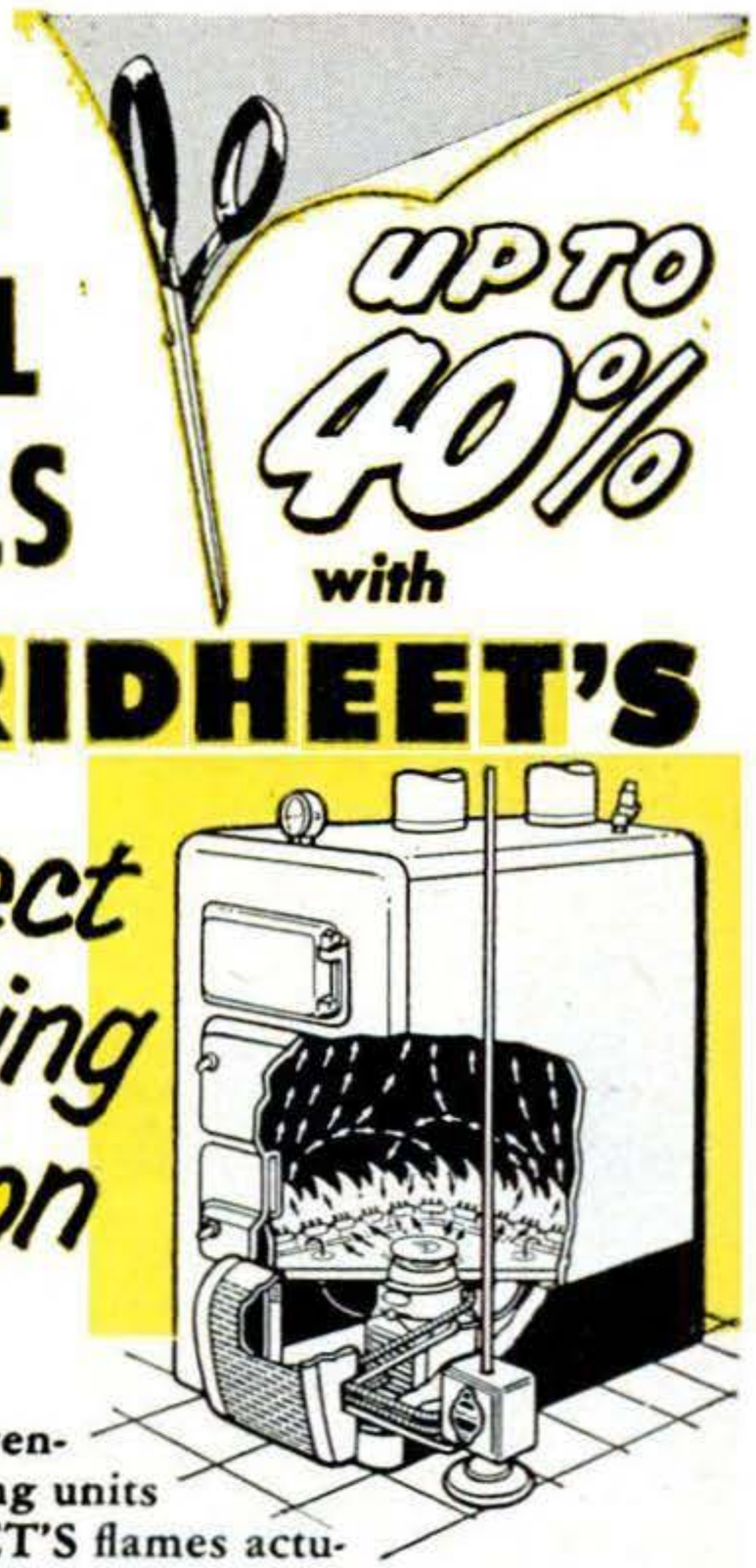
---

The Modern PLASTIC for lasting Home Repairs

PERMANENTLY mends cracks or holes in wood, tile, stone or plaster. Sticks and stays put—Does not chip, shrink or fall out. Easy to use. Economical. Mold it, chisel it, polish or paint it. If unobtainable from your lumber, paint or hardware dealer, the big 4-lb. can will be sent you postpaid (in U.S.) for only $1.25. Full money-back guarantee, order now.

DONALD DURHAM CO.
Box 804-U, Des Moines, Iowa

CUT FUEL BILLS UP TO 40% with TORIDHEET'S

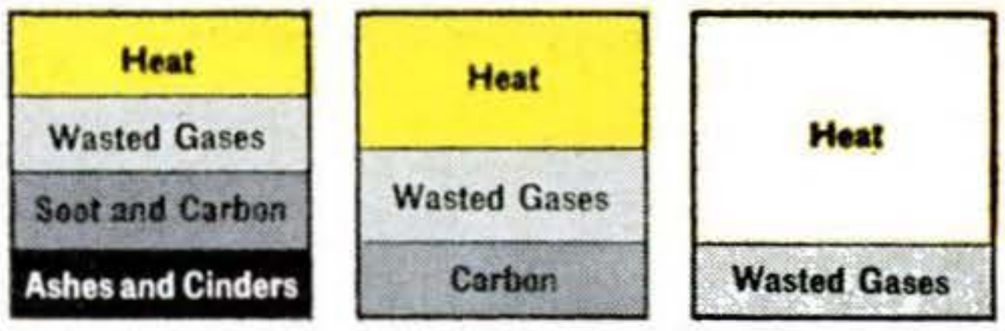


Direct Heating Action

Unlike conventional heating units TORIDHEET'S flames actually *contact* the walls of the combustion chamber, communicating their tremendous heat directly to the surfaces which heat the water or air.

This *direct heating action* insures the maximum efficiency from your fuel. Think what this means to *you*—in dollars and cents.

COMPARATIVE EFFICIENCY TABLES



Complete furnaces or conversion burners — oil or gas

For Fuel Savings up to 40%
MAIL THIS COUPON TODAY!

TORIDHEET DIVISION
Cleveland Steel Products Corporation
16029 Brookpark Rd. • Cleveland 11, Ohio

Please send me complete facts on the TORIDHEET Wall Flame burner with direct heating action.

Name_____

Address_____

City_____ Zone____ State_____

Copyrighted material

Who Just Got The Aviation Job You Wanted?

Thoroughly trained men just naturally get in first and stay ahead in aviation . . . Men who know both "why" and "how"—men with the confidence that comes from the Northrop kind of training. That's why *there's a waiting list of employers for Northrop Graduates.*

Northrop courses *concentrate* on aviation; you graduate sooner, stay ahead of the crowd. Think what this means in *time saved, money earned.*

APPROVED FOR VETERANS

ATTENTION HIGH SCHOOL GRADUATES:
Mail coupon for new Armed Services Bulletin

MAIL COUPON FOR FULL INFORMATION

NORTHROP AERONAUTICAL INSTITUTE
1125 W. Arbor Vitae Street, Inglewood, Calif.

Please send me immediately the Northrop catalog, employment data and schedule of class starting dates. I am interested in:

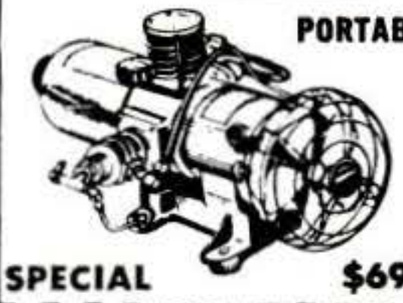
☐ Aircraft Maintenance Engineering Technology
☐ Aeronautical Engineering Technology
☐ Master Aircraft and Engine Mechanic
☐ Jet Engine Overhaul and Maintenance

Name..... Age.....
Address.....
City..... Zone..... State.....
Veterans: ☐ Check here for Special Veteran Training Information

Build Your Own Diving Lung

See July '53 Popular Science Pg. 160
Read Feature Article in This Issue.

PORTABLE AIR COMPRESSOR



High output 3-stage compressor charges up to 1500 P.S.I. Driven by 27 VDC-20 amp.motor . . . EASILY CONVERTED with ½ H.P. motor to belt drive. Measures 12¾" x 10½", extremely lightweight. Mfr.: Cornelius.

SPECIAL $69.50

DILUTER-DEMAND REGULATOR
$8.95 ea.

HIGH PRESSURE TANKS
1800 PSI with Oxygen Valves
HYDROSTATICALLY TESTED
38 cu. ft.
$15.00 ea.

QUICK-RELEASE TYPE WEB SAFETY BELTS

COMPLETE $3.95 ea.

GENUINE FROGMAN'S MASKS
Now $1.95 ea.

SWIM FINS
Pair $3.95

FLEXIBLE NEOPRENE BREATHING HOSE
6 ft. lengths . . .
Easily Cut to Size

JUST $1.50 per length

RUBBER MOUTHPIECE
ONLY $1.00 ea.

RUBBER FLUTTER VALVES
49c ea.

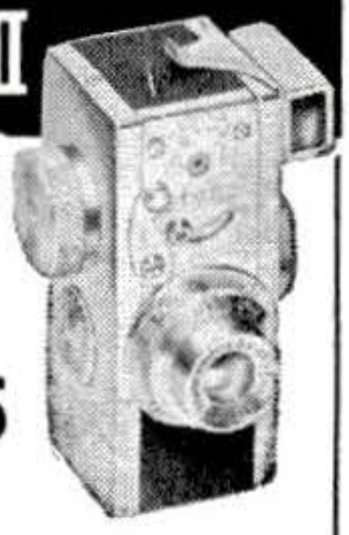
SCREW TYPE HOSE CLAMPS
15c ea.

WRITE FOR LITERATURE
Enclose full amount with order • All prices F.O.B. Pasadena

C & H SALES CO.
2176 E. Colorado St., Pasadena 8, Calif.

World's Finest 16mm Camera . . .

SteKy III



Most economical camera for color or black and white . . . gives brilliant, sharp enlargements to 11 x 14 and up . . .

- f:3.5 Ctd. Stekinar lens
- Automatic film counter
- 1/25th to 1/100 sec. and B.
- Interchangeable lenses

Color and B&W film available with processing. Flashgun, tripod, etc. available. VEST POCKET SIZE.

$21.95 with case & yellow filter

Wide Angle Converter.....$11.95
Telephoto, f:3.2 Ctd. lens.....$17.95

At Your Dealer or Send to: **WILMOT SALES** 151 W. 28 St. New York City

FREE BOOK ON ARTHRITIS

RHEUMATISM • Neuritis • Sciatica

If you suffer the distressing pains of these diseases after the usual remedies have failed, learn about a specialized system of treatment. This marvelous system is fully explained in the Ball Clinic's FREE BOOK. Write Today.

BALL CLINIC Dept. 36 Excelsior Springs, Mo.

WARNING!

ALL VETERANS DISCHARGED BEFORE AUGUST 20, 1952 must be enrolled and **IN TRAINING** by August 20, 1954, or lose G.I. rights to a free education under NEW G.I. bill. We train you at home to become a trained TV Technician—good pay and a bright future in TV! Time is short. Send for 4 FREE AIDS and details! (Non-veterans too!)

RADIO-TELEVISION TRAINING ASSOCIATION, Dept. P-6B
52 E. 19th St., New York 3, N. Y.

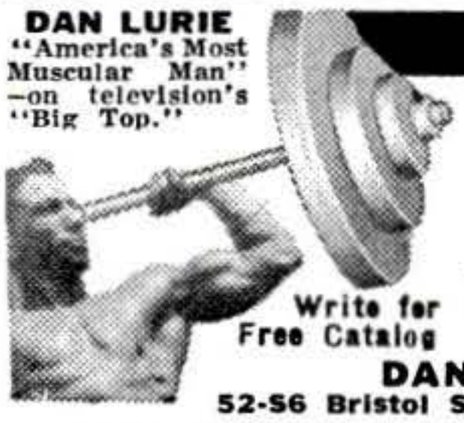
TREASURE -- $10,000

New locator detects metals, valuable minerals and buried treasure. Money-back guarantee of superiority.

Also geiger counters. Govt. reward of $10,000 for uranium discovery. Write for FREE information.

THE GOLDAK COMPANY
1544 W. GLENOAKS BLVD., GLENDALE 1, CALIF.

DAN LURIE "America's Most Muscular Man" —on television's "Big Top."



FAMOUS DAN LURIE

BARBELLS

with 4 courses—low factory prices

50 lb. set....$ 8.48	150 lb. set....$20.48
100 lb. set.... 13.98	200 lb. set.... 25.98

Order by Mail; 50% with order, bal, C.O.D. Extra wts. 13c per lb., F.O.B. plant

Write for Free Catalog

DAN LURIE BARBELL CO.
52-56 Bristol St. Dept. 470 B, Brooklyn, N.Y.

SAVE $ $ DO-IT-YOURSELF

Make your own projects with Reynolds-Do-It-Yourself Aluminum — Easy to work with ordinary hand tools. Order Now

- ROD—⅜" Dia.x6' —1.19 per length
- BAR—⅛"x¾"x6' —1.69 per length
  ¼"x1"x6' 1.98 per length
- TUBING
  ¾" O.D.x6' —1.49 per length
  1" O.D.x6' —1.59 per length
  1¼" O.D.x6' —1.98 per length
- PLAIN SHEET—
  36"x36"x.020" —2.49 each
- EMBOSSED SHEET
  36"x36"x.020"—2.69 each
- ANGLE—
  ¾"x¾"x⅛"x6'—1.59 each
  1"x1"x1/16"x6"—1.89 each
- SCREEN-STORM WINDOW SECTIONS—
  6' sections—.99 per length

Screen Instructions Furnished With Screen Orders.

LIBBY Owens Fibre Glass—Super Fine Insulation—For Home or Auto 24" wide x 1" thick @ .30c Running Foot. Min. order—10 Running Feet. ORDER NOW.
Firestone FOAMEX—Flat Stock—FIRST Quality—

¼" x 18" wide @ .45c Running Foot	1" x 18" wide @ 1.23 Running Foot
½" x 18" wide @ .76c " "	1" x 25" wide @ 1.71 " "
¾" x 18" wide @ .99c " "	We stock all sizes and shapes.

Send 25c for Complete Prices and Literature of all items. Order Now.
Send Check or M.O.—$5.00 orders sent Post Paid.

PACIFIC TOOL CO. BOX 86B PARAMUS, N. J.

Copyrighted material

EASY TO SET UP: A child can do it!

STURDY: Tough, resilient hull of multi-ply rubber tire construction on rugged frames of seasoned mountain ash and plywood. Superior in quality, workmanship to any similar product. No tools needed, no bolts. New snap-lock fittings.

UNSINKABLE: Air tubes around the gunwales keep it always above water.

See the **KLEPPER FOLDING BOATS** *at* 1472 Broadway, New York 18, N. Y.

- Holds 4 adults, plus gear
- Tacks like a dream under sail
- Skims over water with light outboard
- Paddles better than light canoe
- Chosen by Byrd, Amundsen for expeditions
- A Klepper crossed the Atlantic sailed by Captain Romer

Write for FREE Catalogue

KLEPPER CO. Dept. PS6, 1472 Broadway New York 18, N. Y.

Please send me free illustrated color catalogue

Name_____

Address_____

City_____ Zone_____ State_____

BE YOUR OWN BOSS!!!

Make big money! Get ahead in something for yourself! Be a floor surfacing contractor and sand both new and old floors. No experience needed. High earnings, steady work with a future! Write for booklet "Opportunities in Floor Surfacing," enclosing 25 cents in coin or stamps to cover handling.

AMERICAN
FLOOR SURFACING MACHINE CO.
532 So. St. Clair Street • Toledo 3, Ohio

WIN A NEW CAR . . .

One of 251 BIG PRIZES in Crosman's BIG Contest. TV sets, outboards, radios, cameras. Easy to Win! Senior and Junior Divisions. Ask any sporting goods dealer for FREE entry blank and contest rules.

FREE

CROSMAN ARMS CO., FAIRPORT, N. Y., Dept. 46

1000 MILES RECEIVED AT NIGHT!

SKYMASTER RADIO

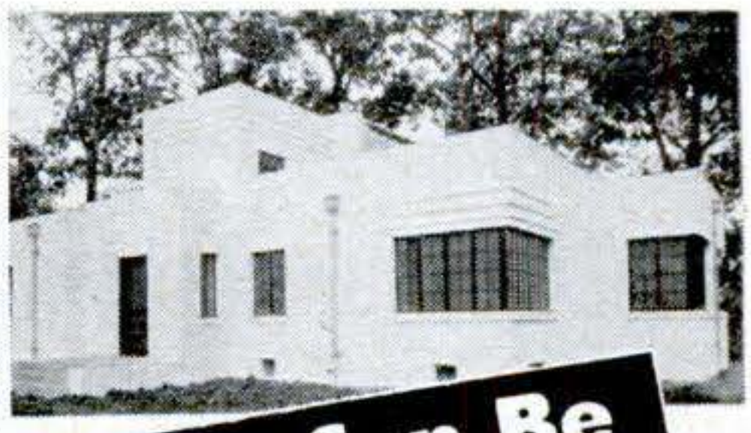
PALM SIZE

Electron tube miniature kit covers standard broadcast band 540 to 1600 KC. Hearing aid battery powered. A PERSONAL radio for home, office, camp, etc. This ideal beginner's kit includes photo diagram for easy assembling. ALL PARTS GUARANTEED. Batteries plus extra "A" BATTERY, $1.50. 1500 OHM ALNICO MAGNET powered earphone $1.45. Flesh-color 1900 ohm HEARING AID EARSET AVAILABLE AT $4.95. C.O.D. orders acceptable with $1 deposit within U.S. and possessions.

$6.75 postpaid

FACTORY-ASSEMBLED $8.95 *(set only)*

PRECISION ELECTRONICS, Dept. J., Placerville, Calif.



C7

Colorcreting Can Be Your Big Opportunity

Local Colorcretors are Needed Everywhere

Colorcreting is a small investment enterprise, rich in sales potentials, high in income possibilities. Work is easy and fascinating. No experience required; we supply complete instructions.

Colorcreting is a building-beautifying process, with Colorcrete being pneumatically applied to new or old masonry surfaces such as concrete or stucco. Lasts indefinitely — 25 years or more. Easily cleaned. Gleaming white, or a choice of 30 colors.

Colorcrete equipment is compact and portable. Easy to operate and practically wear-proof. Easy-payment terms when desired. Write at once for Opportunity Book.

COLORCRETE

Colorcrete Industries, Inc.
572 Ottawa Ave., Holland, Michigan

Copyrighted material

U-MAK-IT BOAT KITS

30 Models

OUTBOARDS & INBOARDS
PRAMS • ROWBOATS
RUNABOUTS — CRUISERS
8 TO 23 FT.

Now you can build your own boat with simple hand tools and no previous building experience. It's easy — you save half the cost. Each part of the famous U-Mak-It boat kit is precision machined — frames, stem, transom, keel, and planking, etc., are ready for assembly. Kits are complete in every detail. Only the finest materials are used. For high performance, safety, and durability — BUILD THE BEST.

SEND FOR BIG ILLUS. CATALOG

Shows complete U-Mak-It line: construction details, incl. everything to build your own. Engines, conversions, hardware, paint and color chart. SEND 35¢ COIN TODAY!

U-MAK-IT *products*
703R—Whittier St. • Bronx 59, N.Y. City

KILL INSECT PESTS

AUTOMATICALLY !

Fly-Master Jr.
REG. U.S. PAT. OFF.

GUARANTEED FOR LIFE!

Ants, Flies, Mosquitoes, Moths, Roaches, Spiders, Fleas, Etc. GONE forever with this amazing, automatic insect control unit Works simply, swiftly and silently. No stains or odors. One application lasts for weeks! Use it in your home, office, motel, camp.

PERFECT FOR VACATIONING !

Full refund if not satisfied in 7 days.

Shipped ppd.—except on C.O.D.'s

DEALER INQUIRIES INVITED

Includes base and 2-months supply of tablets

ACT NOW
Send check or M.O. for
$3.98

FLY-MASTER SALES Dept. A 77 RAILROAD AVE., JERSEY CITY, N. J.

BLOOD PRESSURE GAUGE

$5.98

For Home Use. Now you can check your own condition daily and in the privacy of your home because it's easy to operate this reliable Mercury Gauge without assistance! A manual tells you how to test blood pressure and what to do to avoid or reduce the damaging effects of high blood pressure. You can count on years of dependable service from this apparatus and remember, two pressure reading alone are worth the cost of the entire outfit. Everything you will need is sent prepaid for just $5.98 or C.O.D. plus charges. Free circular sent on request.

JOY SPECIALTY COMPANY
Scientific Instrument Department
2320-G W. Hubbard Street, Chicago 12, Ill.

BUILD your own TV Set

YES, Build your own top-quality TV set. We supply complete equipment, tools, instruction as part of America's finest Home-Study TV Course. Be a highly-paid TV Technician. Install, Repair, Service all makes of sets. No experience needed. Many excellent jobs now open. Or start your own business. Send today for big FREE Book, "You and Television." Commercial Trades Institute, Dept. T1-6, 1400 Greenleaf Ave., Chicago 26, Ill.

STUDY AT HOME LAW FREE BOOK!

PREPARE FOR THE BAR

Write today for your copy of our FREE book, **"THE LAW-TRAINED MAN,"** which describes the famous Blackstone home-study course in bar and business law. All needed instruction material furnished including big 16-volume law library. Bachelor of Laws (LL.B.) degree awarded. Moderate tuition; easy monthly terms. Write today.

Blackstone School of Law **225 N. Michigan Ave.**
Founded 1890 **Dept. 120-A, Chicago 1, Illinois**

Also Eshelman **SPORT CARS WORLD'S LOWEST PRICE** 70 Miles Per Gal. Holds 1 Adult. Free Literature

ESHELMAN ROTARY TILLER

ALSO WALKING TRACTORS FROM $69

Turns virgin ground into a garden bed in one operation. Replaces plowing, discing, and cultivating. Women can operate it. Free Catalog. Write:

ESHELMAN CO., Dept. T-46
119 Light St., Balto. 2, Md.,
333 N. Michigan Ave., Chicago 1, Ill.
7070 Hollywood Blvd., Los Angeles 28, Cal.

DRILL SAW REAM CUT

INTERNATIONAL
HI-SPEED COPE-SAW DRILL BIT

DRILL, SAW, REAM . . . metal, pipe, wood, plastic, Transite, etc. Use with any electric drill, slow drill press, lathe or milling machine. Drills own starting hole—upper part of bit is used to cut, saw or ream circles, ovals, squares, or scrolls. Easy to operate. Ideal for carpenters, mechanics, electricians, plumbers, hobbyists, many others. Abrasive resistant, high speed steel. Flutes ground from solid. Will withstand severe continuous use without breaking. Resharpened at no charge. Takes place of up to $50 in tools. ¼" diameter, 2" cutting sections, total length 3½". Available in three types—All Purpose, Wood, Heavy Metal. Specify type needed. Set of 3, $11.50. Details on request. Shipped same day. Money-back guarantee. Dealer inquiries invited. ORDER NOW! SEND CASH, CHECK OR MONEY ORDER.

only $3.95 POST PAID

Manufactured and distributed by
INTERNATIONAL TWIST DRILL CORP
618 Wyandotte, Rm. 696, Kansas City 5, Mo.

BEAUTIFY YOUR BATHROOM

Now you can have an enclosed bath and SAVE UP TO $100. with the Do-It-Yourself glass bathtub enclosures.

5' Width $89.95 5½' Width $99.95

These custom units can be self-installed in minutes. You can afford this beautiful glass bathtub enclosure and eliminate messy and costly shower curtains—no more splashing on the floors, no more drafts while bathing or showering. Made of frosted or fluted (indicate choice) 7/32" glass, set in neoprene rubber. Heavy gauge, extruded polished aluminum that won't rust or corrode. Overhead suspension with cadmium plated ball-bearings for easy finger-tip control. Drain holes in bottom guide track allow excess water to run back into the tub. These models for recessed tubs only.

Check the prices of other glass bathtub enclosures and you will realize the tremendous savings with this easily installed unit. ORDER TODAY for immediate shipment on money back guarantee. Specify fluted or frosted model and width desired—5' or 5½'. Shipping charges collect. Send check or money order or $10.00 deposit on all c.o.d.'s. No C.O.D.'s outside of U.S.A.

BATTLE SALES CO.
63 South Parkway **Clifton, New Jersey**

Copyrighted material

U. S. Patents
No. 2,351,906
No. 2,461,872

Save Fingers with

Steel-Grip Finger Guards
Lower Your Hand Protection Cost

Hundreds of factories save time and injuries by protecting workers with Steel-Grip Open End Finger Guards. For handling rough, sharp particles, buffing, grinding, sanding, punch press work, and hundreds of other jobs. Protect fingers or thumbs, front or back, from cuts, abrasions or blisters. Various designs in leathers and other materials; elastic web back for snug, cool, comfortable fit. Sizes for men and women. Send 10¢ for sample. *Catalog of Safety Apparel Free.*

INDUSTRIAL GLOVES COMPANY
A Corporation
1425 Garfield St., Danville, Ill.
(In Canada, Safety Supply Co., Toronto)

FAMOUS INDUSTRIAL SAFEGUARDS SINCE 1910

COMBINATION STETHOSCOPE

SURPLUS—*NEVER USED*
High Chrome Finish

$2.95 Postpaid
REGULARLY $12.00

A professional instrument for detecting delicate mechanism defects.

No C.O.D.'s. Send Check or Money Order to Dept. PS-7

JOB LOT TRADING 53 Vesey St. NYC

A "GOOD HAND" HELPS YOU SUCCEED!

LEARN TO WRITE WELL

Your Name beautifully written, plus special pen-point for shaded writing, *Only 10¢*

Handwriting quickly improves with our easy-to-understand picture lessons! Put your spare time to good use: send today for ☐ FREE BOOKLET, "How to Become a Good Penman," or check volumes wanted below at $1 each: ☐ Business Writing ☐ Artistic Writing ☐ Card Writing ☐ Bird & Design Flourishing ☐ Engrossing Alphabets. COMPLETE SET $4.50. Ask for price list of penman's supplies.

OUR 53rd YEAR

TAMBLYN SCHOOL of PENMANSHIP
S. A. Zfller, Pres. 438 Ridge Bldg., Kansas City, Mo., USA

HYPNOTISM

BE POPULAR • AMAZE • ENTERTAIN

Learn to apply Hypnotism and Auto-suggestion in short time, by training at home, with GUARANTEED RESULTS — DON'T DELAY. Write to America's oldest, most famous Hypnotic school for free information - now - today.

JUST FILL IN COUPON AND MAIL

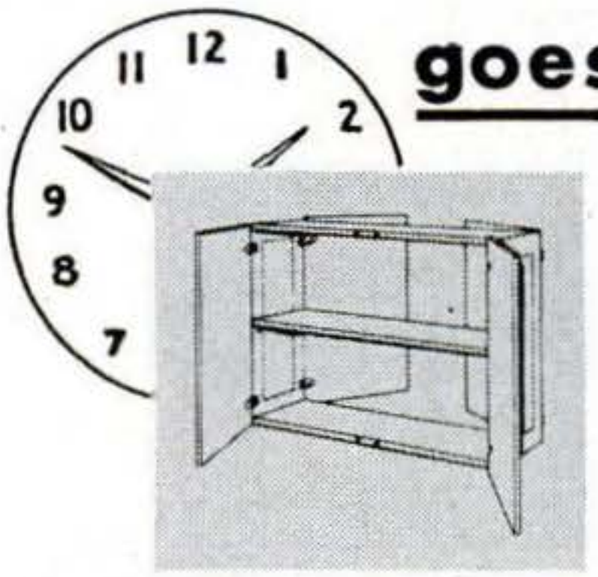
SCHOOL OF APPLIED HYPNOLOGY
Dept. 27
120 Central Park South, N. Y. 19, N. Y.
Please send me Free information:

SENT IN PLAIN WRAPPER

NAME.....

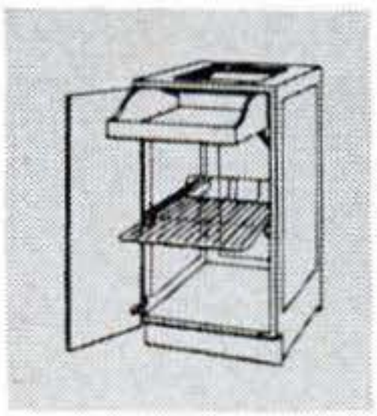
ADDRESS.....

CITY.....STATE.....



Hanging "island" unit with pass-through shelves.

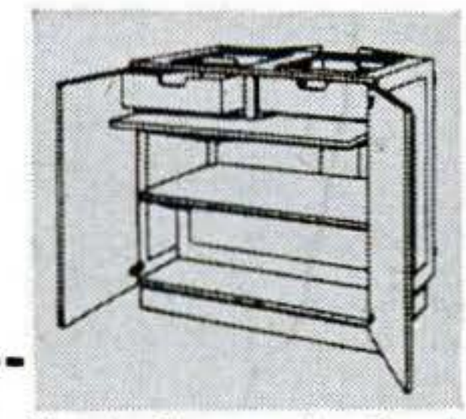
goes together FAST! your NEW Curtis kitchen



Pan storage units come in sizes from 12" to 36". Note sliding tray.

Popular base island unit for use between kitchen and dining area.

Beautiful, natural birch Curtis cabinets—embodying the 53 features women want most—will build your new kitchen in a hurry! You'll get such modern features as swing and revolving shelves—slide-out bins and trays—convenient pass-through units. Curtis cabinets come in sizes to fit *any* kitchen, large or small. In your new or remodeled home, have a Curtis kitchen the quick, easy way! Cabinets are sold through retail lumber dealers everywhere.



KITCHEN IDEA BOOK TELLS ALL. It's colorful—fully illustrated—and just bursting with ideas. Send for your copy!

1866 CURTIS WOODWORK

Curtis Companies Service Bureau
200 Curtis Building
Clinton, Iowa PS-6

Please send Curtis kitchen idea book. I enclose 10 cents.

Name.....

Address.....

City.....*State*.....

Copyrighted material

own your own business! earn up to $75 A DAY CLEAR PROFIT in your back yard or basement!

MAKE CONCRETE BLOCKS With Amazing New LOW PRICED GENERAL BLOCK MACHINE

NOW! Big Building Boom Profits Within *Your* Reach

You don't need much cash to cash in on the building boom! New high speed, low cost General Block Machine produces up to 1,000 concrete blocks a day for homes, factories, buildings, garages. Your profit mark-up is 100% to 150%! Fool-proof, easily operated, sturdy steel machine can make any size from 4" to 12". These superior 3-core blocks meet all building code requirements for foundation, chimney, corner, sash and many other types of blocks. Works indoors or out. Sand, cement and water available anywhere! Simple operating instructions and mixing formulae for cement and cinder blocks supplied FREE. Get full details, no obligation!

EXTRA!

Amazing illustrated book gives floor plans for 6 sensational concrete block bungalows. Tells how to lay blocks, lay out building lines, mix concrete, build steps, porch and concrete floors all at great savings. Written by experts. Can save many times the cost of the machine! Get it now! No strings attached.

R. L. T. of New York City Reports: "My General Block Machine PAID FOR ITSELF IN FIRST 2 WEEKS!"

Thousands now in use the world over

Write for FREE details TODAY

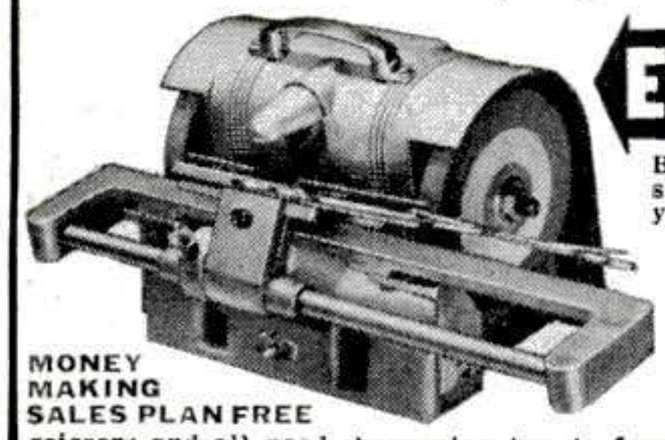
HOW TO BUILD YOUR OWN CONCRETE BLOCK HOME Only 1 Prepaid

SEND $1 — Refunded if you buy machine!

GENERAL ENGINES COMPANY

Dept. S-64, 307 HUNTER STREET, GLOUCESTER, N. J.

MAKE UP TO $5 AN HOUR WITH EASISHARP



Big profits in your spare time sharpening scissors. We show you how to start making money immediately. This is your chance now to have your own business and a steady income. Sharpen a pair of scissors in less than two minutes! A child can operate it. Weighs only 10 lbs. Every home, barber, tailor, dressmaker—everybody uses scissors and all need sharpening two to four times a year. Don't let some one else beat you to this opportunity. Write immediately to

MONEY MAKING SALES PLAN FREE

SERR-EDGE MACHINE CO., 9733 Lorain Ave., Cleveland, Ohio

ACCORDIONS AT LOWEST WHOLESALE PRICES

5-DAY FREE TRIAL

"PAY AS YOU PLAY" Small Down Payment As Little As $10 per month

DIRECT from Importer to You!

SATISFACTION GUARANTEED, or your money back! NOW you can save up to 50% by direct purchase from America's leading distributor of famous genuine ITALIAN ACCORDIONS. TRADE-INS ACCEPTED.

Send for FREE Illustrated Catalog!

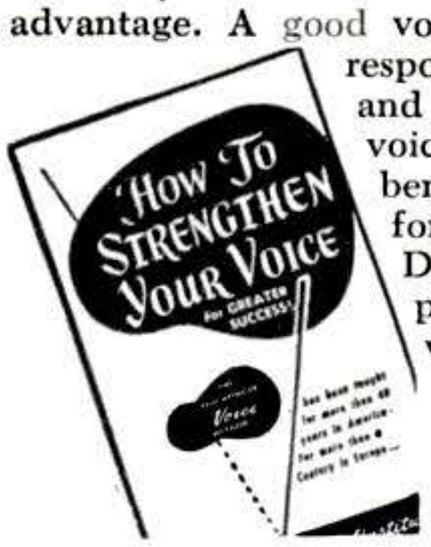
ACCORDION MANUFACTURERS & WHOLESALERS OUTLET

2003 West Chicago Ave. Dept. P-64 Chicago 22, Ill.

When YOU talk—Watch The Expression on People's Faces!

Amazing Training Method Quickly Helps You Develop Confident, Self-Assured Voice

People are impressed by the sound of your voice—either favorably or unfavorably. A trained voice gives you a big advantage. A good voice helps you attain poise, prestige, responsibility. Almost all effective speakers and business leaders have benefited by voice training. You too can enjoy the great benefits of a trained voice. Write today for remarkable FREE booklet, "How to Develop a Successful Voice." Mailed postpaid in plain wrapper; no agent will bother you. State age.



PREFECT VOICE INSTITUTE
Studio FW-1
210 S. Clinton St. Chicago 6, Ill.

Build your own *JET ENGINE!*

Order these plans today

1. JET PROPELLED BICYCLE. Assemble your own. Photo and instructions $1.00.
2. HOW TO MAKE EXPERIMENTAL JET ENGINES. Seven sheets drawings with information and instructions $2.95.
3. BOTH OF ABOVE in one order $3.75.

SEND NO MONEY. Order both at once $3.75 C.O.D. in USA plus c.o.d. postage. Send check or Money Order and we pay postage. Get other information too. Rush Order.

J. HOUSTON MAUPIN, Dept. 66, Tipp City, Ohio

314 STAMPS—25c

Includes Famous GOYA NUDE— plus FREE Stamp Encyclopedia

Spain's most sensational stamp included in this imported collection of 314 different, unusual stamps from dozens of hard-to-get countries! You also get black-bordered **STALIN DEATH STAMP**; first stamp of **U.N.**; etc. Also included, FREE, "Midget Encyclopedia of Stamps." Reg. $3.00 value—ALL yours for only 25c with Bargain Approvals. Send 25c today. **ASK FOR LOT EH-19**

ZENITH CO., 81 Willoughby St., Brooklyn 1, N. Y.

Stop Wasting Gas!

If your car, truck or tractor is a "gas hog"
Try a TUR-B-LIZER 30 days at NO RISK

See why users report up to 6 miles more per gallon. See why carburetor experts call the TUR-B-LIZER the best improvement they've seen for trapping raw gasoline your carburetor fails to vaporize. Only $3.00 for 6-cyl. single manifold TUR-B-LIZER, $4.50 for 8 cyl. or double manifold and easy to install, try it! Money back promptly, if not satisfied. Send check or M.O. to—

Salesmen write for Big Deal

UNIVERSAL SALES 625 E. State St., Milwaukee, Wis.

DuPont NYLON FISHING LINE

Below Manufacturers Cost!

Heat stretched. Will not kink or unravel. Light, strong, durable, quick-drying. Will not rot or mildew. 25 lb. test. 300 ft.

Only 50¢ per spool

Min. order $1. No COD. Money back guarantee.

SCOTT-MITCHELL HOUSE, Inc.
Dept. F-21, 611 Broadway, New York 12, N. Y.

IS YOUR CAR BURNING OIL

Pouring oil into your car doesn't solve the problem. Why burn oil and your money while driving a car that's losing its pick-up day-by-day. You can end your "oil misery" in a jiffy with AUTO LIFE . . . increase compression and save money on gas as well. All you do is squeeze a little of this amazing discovery into each cylinder through spark plug openings . . . your engine does the rest by distributing the seal to all worn pistons, cylinders and ring spots. Stops burning oil because it stops oil from reaching combustion chambers where it burns. Do it yourself in 10 minutes and enjoy new car performance for at least 10,000 to 15,000 miles. Do it with AUTO LIFE and eliminate costly engine overhaul and ring jobs. SEND NO MONEY—pay the postman $3.95 plus postage or send check or money order and we'll pay postage. We guarantee complete satisfaction or your money refunded immediately.

Stop it!

D. Z. AUTOMOTIVE INDUSTRIES, 144-A Henry St., New York 2, N.Y.

Copyrighted material

Shrinks Hemorrhoids Without Surgery

Science Finds Healing Substance That Relieves Pain—Shrinks Hemorrhoids

Science has found a healing substance that shrinks hemorrhoids, stops pain promptly, ends bleeding — without surgery. Doctors report actual shrinking of hemorrhoids. Sufferers say, "Hemorrhoids have ceased to be a problem." The secret is Bio-Dyne® — already widely used for healing injured tissue. This substance is now available in a hemorrhoid ointment called *Preparation H**. Ask your druggist for Preparation H. Money back guarantee. *Trade Mark

---

Prints Postal Cards!

FREE Use on 30 Day Trial! Send name today for facts and FREE Illustrated Book of unique advertising plans and money-making ideas for your business. Learn how others are boosting sales with post card ads . . . easy with Cardmaster.

Cardmaster Co., 1920 Sunnyside, Dept. 1646, Chicago 40, Ill.

MEN WANTED

Earn $100 Per Week and up

AUTO DIESEL MECHANICS

Master a trade with a future—learn Auto-Diesel mechanics in our shops. You learn with tools on real equipment. Earn while you learn. Many of our graduates earn $100 per week and up. No previous experience necessary. Day and night courses. Approved for veterans. Write for free bulletin.

NASHVILLE AUTO-DIESEL COLLEGE

226 7th Ave., N., Dept. 41 Nashville 3, Tenn.

BUILD YOUR OWN . . . MODERN FURNITURE!

POSTPAID

SETS OF FOUR LEGS			
6"	3/8" ROD	$4.25	
9"	3/8" ROD	$4.50	
16"	3/8" ROD	$6.25	
28"	1/2" ROD	$8.00	

FREE . . . Catalogue of modern furnishings you can build or assemble . . . LOW FACTORY PRICES.

PHILLIPS FURNITURE CO.
EAST PEORIA, ILLINOIS

High School at Home

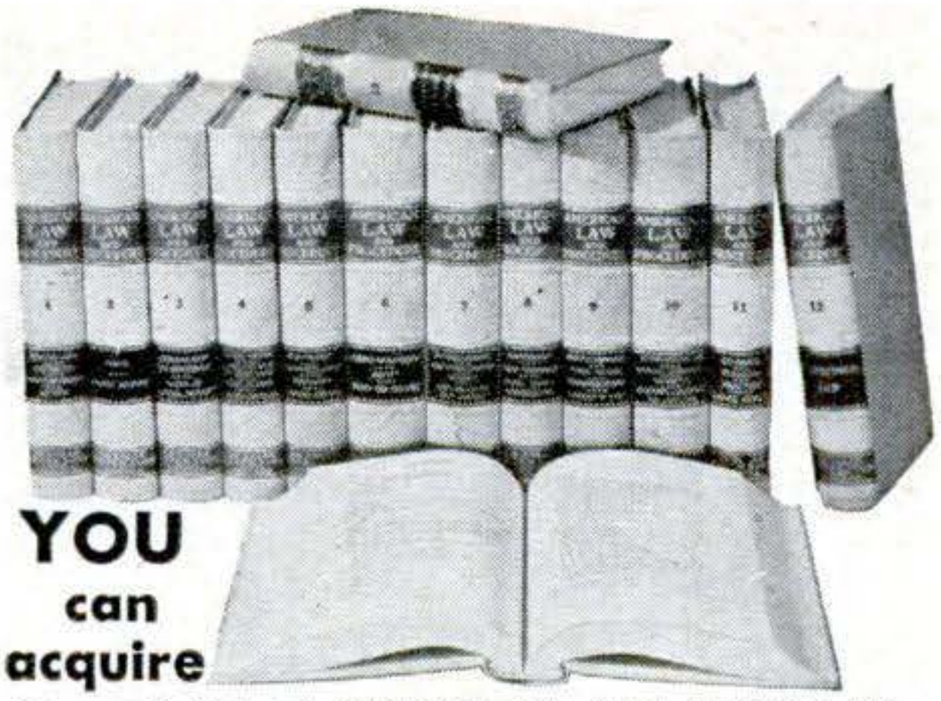
Many Finish in 2 Years

No classes. No time wasted going to and from school. Progress as fast as your time and abilities permit. Standard H. S. texts supplied. Thousands enroll each year in this 57-year-old school. Send for FREE descriptive booklet.

AMERICAN SCHOOL, Dept. HA46
Drexel at 58th St., Chicago 37, Ill.
Without obligation, please send FREE descriptive booklet.

Name.....

Address.....



YOU can acquire LAW NIGHTS AT HOME! L L.B. DEGREE

LaSalle's famous Law Library—used as reference in many Law libraries and Law offices—has enabled thousands to master Law surprisingly fast, in spare hours at home, for business and professional advancement.

These 14 remarkable volumes, compiled by leading professors and lawyers, cover the whole basic field of Law in condensed, orderly, simplified manner.

You advance rapidly with this great library, plus special lectures furnished. We guide you step-by-step with personalized Problem Method of instruction . . . you *learn by doing*—handling legal problems—not by memorizing rules.

Send for two FREE 48-page booklets, "Law Training for Leadership," and "Evidence," answering questions about Law and its value to you, and telling how LaSalle Law graduates are winning rapid advancement in business and public life. Mail coupon below. No obligation.

LA SALLE EXTENSION UNIVERSITY
A Correspondence Institution

417 S. Dearborn St. Dept. 683L Chicago 5, Ill.

Send me your two FREE booklets described above, without obligation.

Name.....*Age*.....

Street.....

City, Zone & State.....

Paint STRIPES with New "PAINT PEN"!

Makes Straight, Curved or Parallel Lines!

Just fill glass vial with any color paint. Use like a fountain pen to stripe furniture, bikes, autos, model planes, toys, linoleum, wall board. Beautiful, clean, crisp results every time, like professional painters. No experience needed to draw straight, curved, circular or evenly spaced parallel lines. Can't clog or smear. May also be used with glue, tempera, textile paint, or ceramic underglazes. Paints on wood, glass, plastics, metal, fabrics and paper. Lasts a lifetime. Only **$1** postpaid, complete with tip for 1/16 inch stripe. C.O.D.'s plus postage. Used by industry. Order your Paint Striping Tool TODAY!

New! "DOUBLE-STRIPE" MODEL Only $2.95

Newest paint striping invention. Makes DOUBLE stripes—one wide and one narrow or two wide or two narrow **at the same time.** Or adapt quickly for wide or narrow single stripe. Makes 5 combinations. FREE—Send postcard for complete information . . . or order now . . . $2.95.

$1.00

DEALERS

Master Paint Striping Tool packed in Display Cartons of 1 dozen. Fast, profitable seller. Write for discounts.

Attention All Home Craftsmen!

New Paint Striping Tool gives "professional" results every time, yet simple and easy to use as a fountain pen. Adjustable guide keeps lines straight as an arrow. Just as easy to make curves or freehand designs. Adds new beauty, finished look to everything you paint. Send $1 now.

WENDELL MFG. CO., Dept. 2-H
4234 Lincoln Ave., Chicago 18, Illinois

6 Other Complete Tools

Complete tools for 1/64, 1/32, 3/64, 5/64, 3/32 or 1/8 inch stripes, $1.50 each. Extra tips 75c ea. COMPLETE KIT with ALL 7 TIPS, $5.00. (Also 1/4" tip, only $1.00). **All tips interchangeable.**

Copyrighted material

DAMP BASEMENT?

Just plug in the amazing

FRIGIDAIRE ELECTRIC DEHUMIDIFIER

Only 18¼" high—20½" long—11¾" wide

Positively controls moisture in linen closets, basements, storerooms, workshops, or any closed area up to 10,000 cu. ft. where moisture is a problem. Fan draws air through refrigerated coil. Moisture is condensed and collected in container. May be connected to drain. Dry, filtered air flows into room.

See your Frigidaire Dealer for further details. Or write for free folder to Frigidaire, Dept. 2246, Dayton 1, Ohio. In Canada, Toronto 13, Ontario.

Built and backed by General Motors

.22 RIFLE CARBINE STYLE

$14.95

Exclusive with UNITED German Precision, simplified, 4 lb. FEATHERWEIGHT rifle. 34" long. Rugged. 1 screw takedown. Automatic ejector with self adjusting sporting rear sight, blade front sight. HIGHLY POLISHED BOLT ACTION. Blued. Amazingly accurate. Replacement parts easily secured. SHOOTS AMERICAN LONGS, SHORTS, LONG RIFLE (regular & hi-powered). *10 DAY NO RISK TRIAL.* If dissatisfied return for refund. Transportation collect. C.O.D.'s require $2 deposit. Mail Orders Only. *State Age.* **United Arms. 9043 S. Western. NHOB-2555. Chicago 20**

ENGINEERING DEGREE IN 27 MONTHS

Big Demand for Graduates

AERONAUTICAL, CHEMICAL, CIVIL, ELECTRICAL, MECHANICAL and RADIO ENGINEERING (inc. TV and Electronics).

Hundreds of young men are earning **B.S. ENGINEERING DEGREES** annually in this recognized institution—year around operation. New terms start quarterly. Many students earn a major part of their college expenses in this large industrial center.

Low tuition. Competent instruction. Thorough, intense, practical program. Modern, well-equipped laboratories including new physics laboratory and modern wind tunnel. Individualized instruction emphasized.

Gov't approved for G.I.'s. Engineering preparatory courses. Students from 48 states and 21 foreign countries. Enter June, September, December, March. Send coupon for free catalog and full information. Enroll now.

SEND COUPON TODAY

INDIANA TECHNICAL COLLEGE
664 E. Washington Boulevard
Fort Wayne 2, Indiana

Please send me free information on B. S. Engineering degree in 27 months as checked.

☐ Aeronautical, ☐ Chemical, ☐ Civil,
☐ Electrical, ☐ Mechanical, ☐ Radio-Television.

Name.....

Address.....

Kidney Slow-Down May Bring Restless Nights

When kidney function slows down, many folks complain of nagging backache, headaches, dizziness and loss of pep and energy. Don't suffer restless nights with these discomforts if reduced kidney function is getting you down—due to such common causes as stress and strain, over-exertion or exposure to cold. Minor bladder irritations due to cold or wrong diet may cause getting up nights or frequent passages.

Don't neglect your kidneys if these conditions bother you. Try Doan's Pills—a mild diuretic. Used successfully by millions for over 50 years. It's amazing how many times Doan's give happy relief from these discomforts—help the 15 miles of kidney tubes and filters flush out waste. Get Doan's Pills today!

GROW ORCHIDS AT HOME

BIG PROFITS SPARE OR FULL TIME

YEAR 'ROUND ANY CLIMATE NO EQUIPMENT

World's most thrilling hobby—profitable home business. Single Orchid plant may multiply into many—each as valuable as the first. **Successful home grower shows you how!** Raise gorgeous Cattleyas, Cymbidiums, Epidendrums, on living-room table. Big-profit orders come from friends, neighbors, florists, etc.—**also Mail Orders.** Illustrated secrets of the experts in simple "show-how" language **AND blooming-size Orchid plants sent at NO RISK. Everything you need to start—for pleasure or profit. FREE**—full details—**SEND NO MONEY.** Write **today. TROPICAL FLOWERLAND,** Dept. 26, 4622 Wilshire, Los Angeles 5, Calif.

Would You Like to Make $1,000 A MONTH?

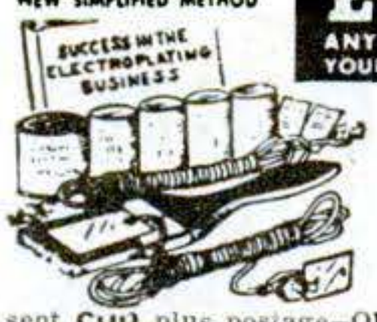
That's what Stanley Hyman made selling the amazing new Presto Fire Extinguisher! Many others "cleaning up"—so can you! Amazing tiny new extinguisher ends fires fast as 2 seconds. **Guaranteed for 20 years!** Sells for only $3.98! Write for **Free** sales kit. No obligation. **(If you want a regular Presto to use as a demonstrator send $2.50. Money back if you wish.) Merlite Industries, Inc., Dept. 116, 114 East 32nd Street, New York 16, N. Y.**

CHANCE TO MAKE MONEY EVERY WEEK

ADDRESS & MAIL POSTCARDS AT HOME

write BOX 9, WATERTOWN, MASS.

NO TANKS USED NEW SIMPLIFIED METHOD



ELECTROPLATE

ANY OBJECT IN HOME, SHOP, GARAGE OR START YOUR OWN WELL PAYING ELECTROPLATING BUSINESS

Refinish • TOOLS SILVERWARE HOUSEHOLD ARTICLES JEWELRY BABY SHOES AUTO PARTS, ETC • like new!

NOW, using **NEW** plating kit, it's easy to electroplate any object. Complete kit and instructions on plating Metal and non-metal objects with nickel, copper, chrome, gold, etc. plus full data on obtaining all the business you desire and make **BIG MONEY** full or spare time. **ONLY $5.95. SEND NO MONEY**—everything sent COD plus postage—OR send $5.95 now and receive it postpaid. Money back in 7 days if not satisfied. **M. Z. NATIONAL SALES CO.,** Dept. PS-2. 113 West 42 St., N.Y. 36, N.Y.

Motor coupling included

DRAINS cellars, laundry tubs; FILLS tanks; CIRCULATES oil; IRRIGATES gardens, fields.

1,001 USES—HOUSE, GARDEN, FARM

Original "Type P" All-Purpose Pump has 2400 GPH capacity. 360 GPH 75' high, or 1500 GPH from 25' well. Use any 1/6 to 3/4 HP motor. Oilless bearing. 1" inlet; ¾" outlet.

STAINLESS STEEL SHAFT. DOES NOT CLOG!

Postpaid if cash with order. (West of Miss. add 50c) MONEY BACK GUARANTEE.

Also larger Centrifugal Pumps and Gear Pumps in all sizes.

$6.95 LABAWCO PUMPS
BELLE MEAD 4, N. J.

Copyrighted material

INSURED TIRE SERVICE
POPULAR BRANDS

SPECIAL! Deduct 10% on orders for Two or More used tires

FREE INSURANCE POLICY given with each used tire sold. We guarantee the amount of service you pay for.

YOU CAN'T LOSE!!

Tube Given Free with Each Used Passenger Tire Upon Request

Super Quality — Rugged Performance — 15 Months Insured Service

600x16	$3.65	670x15	$3.95	700x16	$4.45	760x16	$4.75
650x15	3.85	670x16	4.05	710x15	4.35	820x15	4.95
650x16	4.25	700x15	3.95	760x15	4.45	550x17	4.65

Supreme Quality — Nothing Finer — 30 Months Insured Service

600x16	$5.25	475x19	$5.45	700x15 *6*	$10.45	700x20	$12.50
600x16 *6*	6.75	640x15	4.95	750x16 *8*	15.95	750x20 *8*	15.50
650x16	5.75	670x15	5.35	700x17	11.95	750x20 *10*	17.50
650x16 *6*	7.25	710x15	5.45	750x17	16.45	825x20	21.50
700x16	6.35	760x15	5.95	750x15	10.95	900x20	19.95
750x16 *6*	8.45	800x15	6.35	30x5	11.25	1000x20	20.45
550x18	4.95	820x15	6.35	600x20	10.95	1100x20	21.25
550x17	4.75	550x15	5.35	650x20	11.75	1000x22	21.95
650x15	5.25	670x16	5.15	32x6 *8*	11.95	1100x22	22.75
700x15	5.35	700x16 *6*	10.25	32x6 *10*	12.75	1100x24	25.95

Whitewalls $1.00 extra

MIDLAND TIRE SALES

Speedy shipments on Mail Orders. F.O.B. Chicago. Insurance Policy sent with each order. Deduct 10% on orders for 2 or more used tires. Send CHECK or MONEY ORDER. No COD's.
3701 S. Normal, Dept. SS-20, Chicago 9, Ill.

Auxiliary Accelerator
LEFT FOOT PEDAL

Auxiliary Accelerator Left Foot Gas Pedal makes driving a pleasure. Permits you to relax, and use left or right foot with equal ease. Fits all cars, either clutch or automatic drive.

Guaranteed for Life of Car on Which Originally Installed

Price $6.95 Delivered to You

Patented
Order from R. V. LEHNER, NESS CITY, KANSAS

WHEELS WHEELS WHEELS

7" Disc Wheel 3/4" Tire 3/8" sleeve.....45c ea.
8" Disc Wheel 1 1/8" Tire 1/2" sleeve.....70c ea.
7" Disc Wheel 1" Tire 1/2" ball bearing.....80c ea.
8" Disc Wheel 1 1/8" Tire 1/2" ball bearing.....$1.00 ea.
6" Disc Wheel 1.50 semi-pneum. Tire 1/2" B.B....$1.35 ea.
8" Disc Wheel 2" semi-pneum. T. 1/2" B.B.....$1.50 ea.
10" Disc Wheel 1.75 semi-pneum. T. 1/2" B.B.....$1.50 ea.
10" Disc Wheel 2.75 semi-pneum. Tire 5/8" B.B....$3.50 ea.
12" Disc Wheel 1.75 semi-pneum. T. 1/2" B.B.....$1.85 ea.

Above wheel prices includes hub cap. Plus Postage. C.O.D.'s accepted.
AXLES—Sizes 5/16 in., 3/8 in., 1/2 in.—Cut to size—End holes drilled.

UNITED WHEEL STAMPING CO.
12131 S. PEORIA STREET PS-6 CHICAGO 43, ILLINOIS

CHROME "PERFECTA" **BLANK PISTOL** AUTOMATIC

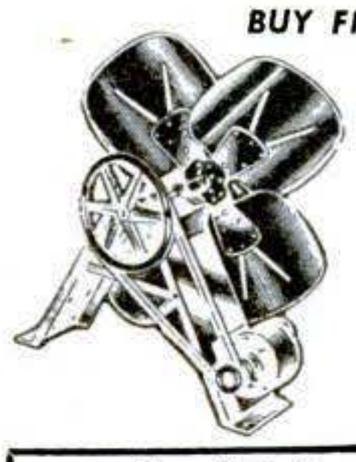
REALLY automatic! Keeps shooting — no delay! Ejects empties automatically! Exclusive feathertouch trigger pull for youths or women. 8 shots. For Sports, Radio, TV Shows! Scares intruders. Chrome Finish. Special at 12.50

REG. MODEL BLANK PISTOL, BLUE FINISH 9.95
BLANK CARTRIDGES • 100 for 1.50

"BY MAIL FOR MALES"

ORDER BY MAIL • No Police Permit Req.
SEND CHECK OR M.O.
GODFREY IMPORT CORP., DEPT. P-6 277 B'WAY, N.Y. C. 7

BUY FROM MANUFACTURER



ATTIC EXHAUST FANS

$39.95 F.O.B. N.Y.

28" COMPLETE WITH 1/3 HP MOTOR A.C. 110V STEEL FRAME-TORRINGTON BLADE GUARANTEED 5 Yrs. Nema Rated 8050 C.F.M.

EASY TO INSTALL & ASSEMBLE

If you cannot visit us send for Fan Parts and Electric Motor Catalogue.

For Use in
HOMES STORES
HOTELS
FACTORIES, etc.

Albin Machine Co. 750 6th Ave., N.Y. 10, N.Y.
425 W. Jefferson Ave., Detroit 26, Mich.
1529 Vine St., Cincinnati 10, Ohio

Send Check or Money Order.
C.O.D. send $5 deposit.

INSTALL IT *Yourself* and SAVE!

YOU CAN GET
25 to 40%
BETTER RECEPTION
on your present TV Set... any make... and you're ready for COLOR!

ANTENNA KITS FROM
Admiral
WORLD'S LARGEST TELEVISION MANUFACTURER

Priced from
$13.95 LIST
at your *Admiral* dealer

UHF Kits
VHF Kits
All-Channel Kits

Kits contain everything needed...antenna, mast, mast mount, guy wires, insulators, lead-in...down to the last screw-eye. Step-by-step instructions are easy to follow. No experience or special tools needed. High-gain antennas get excellent reception. Finest quality, tested and guaranteed by Admiral. Buy from your Admiral dealer.

Copyrighted material

this ONE GOVERNOR

fits ALL popular farm & industrial gasoline engines

PIERCE LONG RANGE Universal Governor

● Instant variable speed selection and accurate engine control at any speed setting within 1600 to 2600 RPM. Higher and lower ranges obtainable by simple change of pulley. Also "constant speed" operation.

● Accurate, dependable speed control for engines operating corn shellers, drag lines, hoists, arc welders, trucks and tractors with power take-offs, etc.

Write for Complete Information.

ONLY **$39.50**

Pulley extra

Send Check or Money Order. State Make, Model of engine.

DEALERSHIPS AVAILABLE

"World's Most Experienced Governor Manufacturer"

THE PIERCE GOVERNOR CO., Inc.
1654 Ohio Avenue, Box 1000
Anderson, Indiana, U. S. A.

FREE 1954 CATALOG

WORLD RADIO LABORATORIES

"The World's Largest Distributor of Amateur Radio Transmitting Equipment."

Jam packed with bargains — everything in Radio, TV, and Hi Fi — for Handyman, Ham, Experimenter or Serviceman!

- Pay Only 10% Down
- Easy Terms
- Liberal Trade-Ins
- Save Over 50% on Used Equipment
- Over 600 guaranteed reconditioned items.

WORLD RADIO LABORATORIES
3415 W Broadway — Council Bluffs, Iowa
Leo I. Meyerson
PERSONALIZED SERVICE

MAIL HANDY COUPON

WORLD RADIO LABORATORIES, INC. Dept. PS-6
3415 W. Broadway — Council Bluffs, Iowa
☐ Free 1954 Catalog ☐ Used Eqp't List ☐ Radio Map 25c 3'x4' U.S.

NAME_____
ADDRESS_____
CITY_____ STATE_____

Authenticast

NO FINER TRUE-TO-SCALE MODELS MADE!

PRECISION DETAILED
PERFECTLY SCALED

Scale: 1" to 108"

Miniature beauties! Cast in metal and accurately scaled. Every minute detail distinctly "Authenticast" - famous the world over. See them all clearly illustrated in cat.

5185 4 x 4 Weapons Carrier $1.75

5186 Medium Tank M-47 $2.00

5187 Heavy Tank M-48 $2.00

Also Ships, Planes and HO Railroad Operating Equip.

Send for big Authenticast catalogue – 35¢

COMET METAL PRODUCTS CO., INC. RICHMOND HILL 18, N. Y.

AMAZING NEW POCKET SIZE RADIO

Really Works—Small as a Pack of Cigarettes!

FITS IN ANY POCKET OR PURSE—GETS LOCAL RADIO STATIONS WITH CLEAR BELL-LIKE TONE—NO STATIC OR INTERFERENCE! NEEDS NO TUBES, BATTERIES OR COMPLICATED HOOKUPS! NO AC PLUG INS! Nothing to wear out. Thousands of users—many report years of service. Uses new crystal diode and HI-Q coil. SELF-CONTAINED SPEAKER PHONE. Just the tiny radio to take with you ANYWHERE YOU GO—ON TRIPS, VISITING, ETC.—for real fun and enjoyment—ANYTIME. **SEND ONLY $1.00** (bill, ck., mo.) and pay postman $3.99 C.O.D. postage or send $4.99 for p.p. delivery. COMPLETE READY TO LISTEN.

MIDWAY CO., Dept. PPS-6, Kearney, Nebr.

Find Out How You Can Earn Big Pay As A

TAX CONSULTANT

Write for valuable free information. Training program covers all phases of income tax. Study at home in spare time. No previous experience necessary. Be among first to take advantage of this opportunity for good earnings. Write for booklet today.

School owned and operated by M. L. Kolodny, former U.S. Internal Revenue agent.

KOLODNY SCHOOL OF INCOME TAX, Dept. PS-6
4048 N. Sheridan Road Chicago 13, Illinois

RUPTURE

RELIEF...OR YOUR MONEY BACK

Write now for free booklet and pictures of rupture care. You can be helped...work steady, with low cost, easy to wear Web Truss, thousands satisfied.

WEB TRUSS CO. Dept. PS-6, Hagerstown, Maryland

When Writing to Advertisers, Please Mention Popular Science

DRIVE 500,000 MILES

Without Need Of A Major Overhaul

ENGINEERS HAVE PROVEN THIS POSSIBLE. They have shown that the combustion process produces more than a gallon of water in vapor or steam for every gallon of fuel burned. Some of these vapors enter crank case causing rust, varnish, acids and sludge.

INSTALL POWER VENTILATION—
GET UP TO 2 or 3 MORE MILES PER GALLON—
CUT ENGINE WEAR UP TO 40%—

Increase the overall operating efficiency of your car with amazing Moto-Vent. Positive Power Ventilation removes water vapors, sulphur and other corrosive materials that enter crank case. Not a "gimmick" or "gadget" but a precision engineered instrument designed to give better engine performance, up to 2 or 3 more miles per gallon and cut engine wear up to 40%. Oil and water vapors are fed back into the combustion chambers where they give you water injection and overhead lubrication. No extra oils or additives needed. **EASY TO INSTALL—DO IT YOURSELF.** Fits all cars, trucks, tractors—old or new. Install Moto-Vent between oil breather and intake manifold in less than half hour. Will soon pay for itself.

FREE 30 DAY TRIAL OFFER. Moto-Vent complete with all fittings and easy to follow installation chart only $4.95 postpaid, or, C.O.D. plus charges. Try for 30 days. If you are not completely satisfied return for full refund. Send order or write for further FREE particulars, today!

PRECISION PRODUCTS CO., Dept. 17, Harvard, Ill.

Copyrighted material

LEARN MEAT CUTTING AT NATIONAL

Pay After Graduation

The steady dependable trade of Meat Cutting taught easily in 8 short weeks. You LEARN BY DOING under actual meat market conditions in big modern school at Toledo.

For beginners or men with experience. Get a Profitable store of your own. Remember, PEOPLE MUST EAT! Big pay jobs. Free employment help. Thousands of successful graduates.

Buying, cutting, percentage, pricing, advertising, selling, etc. A complete retail meat education. National School established over 30 years. Get National training NOW. Pay your tuition in easy weekly payments after you graduate. Get all the facts. Send coupon for FREE 52 page school catalog—TODAY. G.I. Approved.

National School of Meat Cutting, Inc.
Dept. 51-F, Toledo 4, Ohio

Send me your FREE school catalog on National Training at Toledo in Meat Cutting, Meat Merchandising and Self Service Meats. No obligation. No salesman will call.

Name..... .....Age.....

Address.....

City.....State.....

Approved for training Korean veterans

"HORSES NECK"

SAWHORSE BRACKET

Per Pair **$2.00** POST PAID

Pre-Fabricated

Easy To Assemble—Temporary or Permanent!

Clever time-saver, at home or at work! Ready to use, formed from Heavy Gauge Steel. Just saw standard 2"x4" to desired length, then 4 more for legs. Make simple, temporary tables, seats, work bench, many other uses around home or shop. RUSH $2.00 FOR EACH PAIR WANTED! We ship postpaid! (Or, if preferred, we ship C.O.D.) SATISFACTION GUARANTEED OR MONEY RETURNED!

GEM MACHINE CO. (Dept. 1)
45 SYCAMORE WATERLOO, IOWA

Invisible Gloves Protect Against Grease, Grime, Paint

Just rub on Du Pont PRO-TEK hand cream before you start dirty jobs. You'll be wearing invisible gloves. When the job is done, wash off the PRO-TEK. Dirt, grease, paint wash off with it! Leaves hands soft, stain-free. Get PRO-TEK for about 49¢ at drug, hardware, auto supply stores.

DU PONT PRO-TEK®

DU PONT REG. U.S. PAT. OFF.

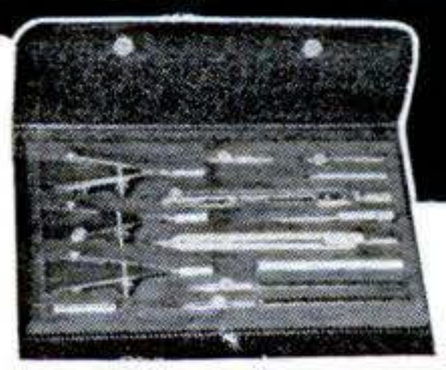
Better Things for Better Living ... *through Chemistry*

DRAFTING

YOUR LADDER TO SUCCESS

It's EASY if you use CEI Simplified Training & Coaching

Get in on the big money industry is offering for draftsmen. CEI will teach you Drafting easily and quickly in your spare time at home and help you get a job. Be like industry's leaders and use drafting as your springboard to success.



You Get This Professional Set of Instruments at no Extra Cost!

FREE SUCCESS BOOK

Cleveland Engineering Institute
Extension Division PS6D
6300 Euclid Ave.
Cleveland 3, Ohio

( ) Aeronautical ( ) Mechanical

NAME.....

ADDRESS.....

CITY.....STATE.....

No Obligation—No Salesmen

CLEVELAND ENGINEERING INSTITUTE

Copyrighted material

BIG VALUES IN ALLIED'S LATEST TV-RADIO SUPPLEMENT

FREE *send for it*

Everything for Experimenters, Builders, Amateurs, Servicemen, Hi-Fi Fans

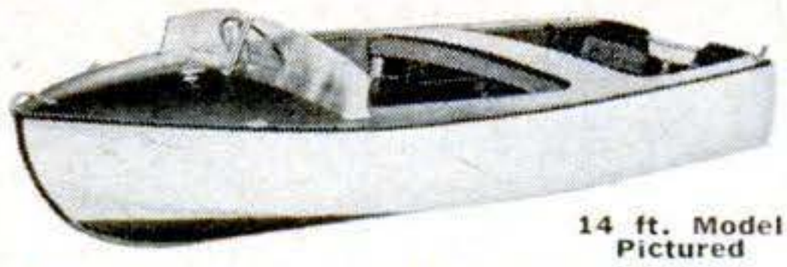
Send for our latest bargain-packed Supplement listing big values and new releases in TV accessories, custom chassis, High Fidelity systems and components, P.A. systems, recorders, FM and AM radios, Amateur supplies, test instruments, builders' kits, electronic parts, tubes, tools and books. Make your selections from the world's largest stocks of electronic supplies at lowest, money-saving prices!

ALLIED RADIO
100 N. Western Ave., Dept. 7-F-4
Chicago 80, Illinois

Send for Supplement **FREE**

ALLIED RADIO

FREE CATALOG BOAT KITS



14 ft. Model Pictured

- Assemble your own boat
- No experience necessary
- Save 1/2 to 2/3 "factory built" prices
- Prices include freight and paint
- Models from **39.25** complete

Trailers, Fiberglas, Marine Hardware

LUGER INDUSTRIES Marine Division 3207 FREMONT AVE. SO. MINNEAPOLIS 8, MINN.

RUPTURED

Modern NON-SURGICAL Treatment Completely Heals Most Reducible Ruptures WITHOUT SURGERY or Hospitalization

These **Non-Surgical** treatments are so certain, that a Lifetime Certificate of Assurance is given. Hundreds have been successfully treated here the past few months. Write today for our New FREE Book that gives facts that may save you painful and expensive surgery, and tells **how non-surgically** you may again work, live, play and love and enjoy life in the manner you desire.

Excelsior Hernia Clinic Dept. 3703, Excelsior Springs, Mo.

Save MORE THAN 1/2 *Now* $11.95 Plus 10% Fed. Tax Usually $24.95

Famous "BRITIX" 17 JEWEL With the Famous "SCHILD" Movement, trouble-free and dependable. Incablock (SHOCK PROOF) WATER-RESISTANT. Anti-Magnetic. Stainless Steel Case, Luminous Dial, Unbreakable Crystal, Genuine Calf Skin Strap, Sweep Second Hand. ONE YEAR Written GUARANTEE.

Send payment with order. $13.15 for immediate delivery or sent C.O.D.

Mardo Sales Corp., Dept. SW-Z
480 Lexington Ave. New York, N. Y.

Also Eshelman **SPORT CARS** WORLD'S LOWEST PRICE

70 Miles Per Gal. Holds 1 Adult. Free Literature

RAKES PLOWS CULTIVATES HARROWS HAULS SPRAYS SAWS DOZER MOWS CUTS ROLLS TILLS SNOW PLOW

ESHELMAN FOR Better LAWNS And GARDENS

1 to 8 H.P. Also Walking Tractors Low as $69

Women Can Operate it. Free Catalog. Write

ESHELMAN Dept. R-46
119 Light St., Balto. 2, Md.
333 N. Michigan Ave., Chicago-1, Ill.
7070 Hollywood Blvd., Los Angeles 28, Cal.

EQUIP YOUR CAR WITH AN

AIR CONDITIONER

Complete "EASY-TO-INSTALL" Kit only $164.70

Now you and your family can drive in cool comfort. Banish dust, noise and draughts. Save up to $400.00. Kit includes 2-ton capacity compressor and all essential parts. FREE LITERATURE.

W. SLACK
3716A Belmont, Dept. 90, Chicago 18, ILL.

GRAY HAIR GONE FOREVER WITH *Gray-away*

Look years younger

By applying just a few drops daily of amazing liquid Gray-away, the proven formula, every trace of gray hair will be gone.

Just as graying comes on slowly, so does Gray-away gradually blend your graying areas with your natural color hair.

All this in 2 to 3 weeks without sudden embarrassing color change. Once the magical effect has been achieved, a few drop of Gray-away each week will keep you looking years younger.

Gray-away works its wonders on your gray hair whether your natural hair was blonde, brunette, or redhead. Not necessary to specify color.

WOMEN LIKE GRAY-AWAY TOO WILL NOT HARM PERMANENTS
- Safe to use
- Will not wash out
- Will not stain
- Not sticky or greasy
- Gray-away is odorless

TRANSCONTINENTAL VENDING CO., Inc. Dept. V-6
16 North Ridge Rd., Mohegan Lake, N. Y.
Please send me a bottle of GRAY-AWAY at once
☐ 1 month supply $2 ☐ Payment enclosed
☐ 2 mo. supply $3 ☐ Send COD plus post
Name _____
Address _____
City _____ State _____
Satisfaction guaranteed or your money back

Earn BIG STEADY MONEY

SELL WORK UNIFORMS!

It's easy with TOPPS great "Panoramic" line that spreads out over 3 feet wide! Swatches are king size! Style figures are big, full color—they almost pop off the page! Prospects are everywhere—garages, service stations, factories, etc. Profits are big—one man made $800 on a single sale! Selection of sizes, fabrics (including DuPont's miracle ORLON), colors, embroidery is unlimited. Start spare time . . . you'll make it a career! Get the "Panoramic" line FREE. Write TODAY.

TOPPS Dept. 626 - Rochester, Indiana

CUT BUILDING COSTS 2/3

Make Your Own Concrete BLOCKS and BRICKS To Use or Sell

New superior moulds make absolutely square, true, easy-to-lay blocks which will pass any building code. Production is fast . . . easy. One durable $30 machine will make four 5"x8"x12" blocks per minute—1,000 a day. Pays for itself in one day! Sell blocks for big profit . . . or save 2/3 building cost for yourself. POST CARD BRINGS FREE FOLDER.

ECONOMY MFG. CO.
DEPT. S STONE MOUNTAIN, GA.

Copyrighted material

7 x 50 $29.95

New, improved, superb, lighter binoculars that are easier to hold, easier to focus, and lower priced. The 7x50, 5¼" x 7½" has tremendous light gathering power and provides brilliant, crystal clear images. **ALL** binoculars are both water, dust resistant. **UNI-COATED!** Inside surfaces of **vital** prisms **and** front and rear Achromatics are COATED for brighter, sharper viewing! Made in Japan by skilled optical craftsmen of precision materials. It explains why prices are so low and quality so high.

6 x 30	I.F.*	4½"x6" 15½ ounces	$24.95
7 x 35	I.F.*	5¼"x5¼" 20 ounces	27.95
8 x 25	I.F.*	4"x5¼" 12 ounces	19.95
12 x 50	C.F.*	5¼"x7" 27 ounces	39.95
15 x 65	C.F.*	8½"x9" 51 ounces	59.50
7 x 35	C.F.*	WideAngle525'field26oz.	49.95

Add $1.00 for postage and handling. *I.F. are individual and *C.F. are Center Focus. Genuine leather case and straps included.
UNCONDITIONALLY GUARANTEED. USE 30 DAYS AT OUR RISK. If not fully satisfied return for full refund. C.O.D.'s require $2.00 deposit. Add new, lower Federal tax only 10%.
UNITED BINOCULAR CO., 9043 S. Western, Dept. ARF-9716, Chicago 20. DEALERS WANTED.

PUMP WATER *FAST!*

DRAIN WASH TUBS, CELLARS, CISTERNS. Famous #7 pumps 2800 GPH. 420 GPH at 75' high or 1600 GPH from 25' well. Sturdy, rustproof Alloy Metal. Six Blade impeller. Uses any ⅛ to ½ H.P. Motor. Will not leak or clog. Fits any garden hose. Immediate money back guarantee. Send Check, Money Order, or C.O.D. . . . . **$8.95** IN U.S.

IRRIGATE, FILL TANKS, DRAW WELL WATER. Heavy duty #8 Pumps 7000 GPH. 1000 GPH 75' high — 3000 GPH from 25' well. Rustproof Alloy Metal. 8 blade impeller. 1" inlet — 1" outlet. Standard Pipe Threaded. Money back guarantee. Send check, Money Order, or C.O.D. . . . . **$11.95** IN U.S.

Free Catalogue — Gear Pumps — Deep and Shallow Well Pumps.

MOORE MANUFACTURING CO.
SWEDESBORO 13 NEW JERSEY

DIVING EQUIPMENT

HEADQUARTERS

Aqua-Lungs—Recirculating Sets. Sports Diving Masks and Fins. Italian and French importations. Deep-sea Navy surplus (new) Rigs complete for contractors and salvage work. Mask Type Commercial Sets.

World's Largest Stock—Write for Catalog—20c

M. & E. MARINE SUPPLY CO., P. O. Box 601-G, Camden 1, N. J.

DINSMORE... AUTO COMPASS

Enjoy traveling with America's finest auto compass. Accurate—dependable—trouble-free. Quickly and conveniently mounted on any car. Always insist on a DINSMORE—It's the only compass approved by auto manufacturers. Send for free folder "Pants' Knives, Compasses" and name of nearest dealer.

TRAVELITE
Only **$5.49**
Illuminated

Guide-Way $4.49
Non-Illuminated

Dinsmore Instrument Company
1814-31 Kelso St., Flint, Mich.

"HOW TO EARN MONEY IN YOUR SPARE TIME"

SENT FREE!
RUSH POST-CARD NOW!

In your own home . . . PRINT WITHOUT A PRINTING PRESS. Miracle New Printing Method. Print full color SIGNS, POSTERS, BANNERS, FABRICS—anything. Print hundreds at a time ($100.00 jobs cost you less than $10). NO ART ability necessary. It's easy! We supply everything! REPRESENTATIVES WANTED. Unlimited profit opportunities. Help fill HUGE DEMAND. *Write!*

SCREEN-PRINT, DEPT. 1-6, 1010 S. LOS ANGELES ST., LOS ANGELES 15, CALIF.

STOP BURNING OIL!

LOSING POWER
WASTING $$$

When your car "eats-up" oil, loses that get-up-and-go power, has poor gas mileage, it's a sure sign that you have worn rings, pistons, and cylinder walls in your engine. This is robbing you of driving pleasure and valuable $$$ to the tune of $250 every 10,000 miles in oil, gas, and repair bills.

WHAT CAN YOU DO ABOUT IT?

You can either have an expensive overhaul job done or offset this wear with a

RING-RE-NU MOTOR RECONDITIONER KIT

It's the inexpensive, proven answer to a worn engine. This terrific 1-2 combination restores power and zip to your car without expensive repair work, reduces oil burning, slashes gas consumption, brings back that "new car" performance to your car.

HERE'S HOW THIS DOUBLE VALUE KIT PERFORMS!

1. PVR COMPOUND—is a hard hitting engine reconditioner that removes sludge, tars, sticky greases from a tired, worn engine. Pour in carburetor, idle engine. Leaves rings, valves, pistons whistle clean, ready for . . .
2. RING-RE-NU — this amazing compound when squeezed by tube on pistons forms a tough, pliable, self-expanding seal on rings and pistons to compensate for wear.
RESULT! — You get power-packed, economical driving pleasure. Good for 10,000 plus miles. Adds years to the life of your car. Guaranteed not to harm the finest engine. Takes only 30 minutes to install.

PROVEN SUCCESSFUL! Over 100,000 customers acclaim results! —

You risk no money!—Ring-Re-Nu must reduce oil burning—improve compression in your car. Try it for 400 miles — if results aren't favorable—return empty tube and can — full purchase price refunded!

1 tube kit $4.95 ppd. treats all cars except large 8 cyl. autos which require 2 tube kit at $8.95 ppd. sold with money back guarantee. (C.O.D's accepted. $1 deposit required, bal. and postage on arrival.)

FREE with your order from this ad — one "Micro-Moly" crankcase treatment worth $1.50!

RUSH ORDER TO:

Only **$4.95** **POSTPAID**

RICHIE DISTRIBUTING, INC.
11916 MADISON AVE. • DEPT. K6 • CLEVELAND 7, OHIO

FREE

A NEW HOME INDUSTRY

OPPORTUNITIES UNLIMITED

Let us show you how extremely easy and **PROFITABLE** it is to make beautiful and useful things out of **LIQUID PLASTIC, LIQUID MARBLE, LIQUID IVORY, LIQUID GLASS, CERAMICS, ETC.** . . . as easy as pouring water out of a glass! Make novelties, jewelry, gifts, artware, toys, tools, dies, gadgets, ceramics . . . a million useful things! We supply everything—**MATERIALS** and **INSTRUCTIONS!** Send only 25c for big 64 page catalog of casting materials, molds and accessories and we will include free of extra cost a remarkable book, **"THE WONDERS OF LIQUID PLASTICS"** . . . that will open your eyes to wonders you never dreamed of! Send 25c today—*this may be the lucky coin that will start the most fascinating and profitable phase of your life!*

PLASTICAST COMPANY, (Dept. A)
P.O. Box 6737 Chicago **80, Ill.** — *(Write to either address)* — **P.O. Box 987** Palo Alto, Calif.

PLASTIC LAMINATING

This remarkable Plastic Laminating Machine will earn $18.00 an hour right in your kitchen! Big profits laminating Business, Social Security, Identification, Credit CARDS of all kinds, photos, passes, clippings, etc. Price complete (illustrated) $35.00 plus postage. Others higher. **Free literature!**
PLASTICAST CO. (Addresses above)

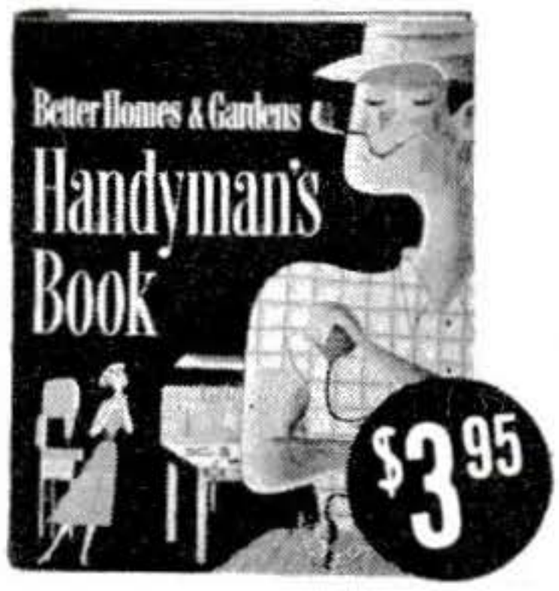
Copyrighted material

Shows You The Easy Way To Do *1600 Jobs*

HOW TO DO your own home maintenance—expertly. How to improve your home, do building and decorating—at less cost in time and money.

CLEAR, SIMPLE instructions and step-by-step pictures make even difficult jobs easy. Owners report: "the best book in the field."

We guarantee! that the 510-page *Better Homes & Gardens* HANDYMAN'S BOOK will *save you more than its cost* within the first 6 months. Get it wherever books are sold, or use handy coupon to order by mail.



BETTER HOMES & GARDENS
417 Meredith Bldg., Des Moines 3, Iowa
Please send me the HANDYMAN'S BOOK. I enclose ☐ check OR ☐ money order for $3.95. (Canada, $4.50.) If not entirely satisfied, I may return book in 10 days and my money will be refunded.

Name_____
Address_____
City_____ State_____

NO BETTER RELIEF AT ANY PRICE for ACID INDIGESTION

TUMS

SAFE, FAST, SURE, PLEASANT

STILL ONLY *10¢* A ROLL

MODERN
LAWN MOWER SHARPENER

Service departments of leading Lawn Mower manufacturers use the Modern Lawn Mower Sharpener. One lever moves lawn mower into grinding position. Gasoline and oil remain in engine while sharpening, no dismantling of wheels, roller or handle. The Modern is a precision bed knife grinder—no extra grinder to buy. Imitated but never equaled—Compare before you buy.

If it isn't a Modern it can't be Modern

(Prices subject to change without notice)

WRITE FOR FREE BOOKLET 11D

$263.00 with motor F.O.B. PASADENA

MODERN MFG. CO.
160 N. Fair Oaks - Pasadena 1, Calif.

SAVE MONEY

BUILD YOUR OWN CABIN, RANCH HOUSE *or* HIDEAWAY

For the Cost of Materials Alone!

Here's an amazing new book that shows you how to build your own cabin, lake cottage, modern ranch house, or mountain retreat at *lowest possible cost!* In all, you have 27 different, easy-to-follow plans to choose from.

SIMPLIFIED DETAILS

You don't need expensive professional help when you have *"How to Build Cabins and Ranch Houses"* at your side. This brand-new book gives you 256 pages of step-by-step instructions and hundreds of "show-how" illustrations to help you lay the foundation, build and caulk walls, construct stairs, lay floor boards, estimate costs. You'll find detailed plans that show you how to make windows, build fireplaces and chimneys, cut doors, install plumbing and lighting. You'll also learn how to prevent wood decay, build rustic furniture and lots more! It's truly a home builder's "dream book."

SEND NO MONEY NOW!

Detach and mail coupon below. When book arrives, pay postman the low, bargain price of only $2.49 (plus postage). Examine it for *a full week at our risk!* Then, if you don't agree you would ordinarily pay twice the price for such a big, jam-packed book, simply return it for prompt refund. But HURRY—get your copy while they last!

MAIL COUPON TODAY

POPULAR SCIENCE PUBL. CO., Dept. 654
353 Fourth Avenue, New York 10, N. Y.
Please send me a trial copy of *"How to Build Cabins and Ranch Houses"* today. I'll pay postman $2.49 (plus postage) on delivery. If not delighted, I may return book within 7 days for full refund.

Name.....
Address.....
City..... Zone..... State.....
☐ *Check here if you remit now. We pay postage. Same refund guarantee.*

Copyrighted material

Get into.. PLASTIC LAMINATING AT HOME!

THIS MAN . . . . . is taking out of the machine a Plastic Sealing Job — ordered by mail — only 11c in material cost brings back $2.58 in cash by mail. Capacity of machine: **$25.00 profit per hour of operation.**

Get ORDERS and CASH from your mailman—do work in SPARE TIME at home —or expand into FULL TIME business. Send coupon for Free facts about the newest and most fascinating of all home operated businesses. For the first time a simplified machine brings the fabulous profits of **Plastic Sealing** and **Plastic Laminating** within the reach of the small operator. Anyone can learn to operate the machine with a few minutes practice—then with our **Magic Mail Plan** can get mail orders pouring in daily with cash in every envelope. ***No canvassing—no selling.*** We even supply the circulars you mail to bring back cash and orders. Don't waste a minute. Rush your name. We'll send you FREE and postpaid, pictures, prices, details, and all the facts you need to start. Mail coupon or send name on postcard. No charge.

Make $20 to $30 a Day by.. MAGIC MAIL PLAN!

Warner Electric Co., 1512 Jarvis Ave., Dept. L-9-H, Chicago 26, Illinois

Make Thousands of Beautiful Art Creations

COSTUME JEWELRY • CIGARETTE BOXES TRAYS • CANDLESTICKS • COASTERS LAMP BASES • BOOK ENDS...ALL IN SPARKLING COLORED PLASTIC

WARNER ELECTRIC CO., 1512 Jarvis Av.
Dept. L-9-H, Chicago 26, Ill.
At no cost to me, please rush complete details postage prepaid. I am under no obligation.

*Name*_____

*Address*_____

*City*_____ *Zone*____ *State*_____

LOOK BETTER! FEEL BETTER!

USE A

Vibrosage®

ELECTRIC MASSAGER

- Professional-Type
- 4 Scientifically Designed Applicators
- Sanitary

A few minutes daily use of VIBROSAGE gives that stimulating, healthful aid to circulation . . . relief from aches and pains. *Four* applicators assure maximum effectiveness for scalp, face and body. Operates on 110 volt, 60 cycle A.C. *Five day trial—money-back guarantee!* If your dealer cannot supply you, send $8.50 check or money order, for prepaid shipment. Or, send $2; pay postman balance plus postage and C.O.D. charges.

BEAUTY APPLIANCE CORP., Dept. V534-F RACINE, WIS.

TRY MONTAMOWER on YOUR OWN LAWN on *Approval!*

9 1/2 LBS.

TRIMS AS IT MOWS!

SPECIAL TRIAL OFFER

Save time and labor! Actually "Two-Tools-In-One", the versatile MontaMower is an amazing work saver! Try it on your own lawn, on our Special On Approval Trial Offer! Its live, precision mechanism first gathers, then smoothly cuts a clean 16" swath through grass, dandelions, tall lawn weeds. Cuts right up to walls, fences, trees and under overhanging shrubs . . . practically eliminates hand trimming! Cuts steep banks easily! Cutting discs are now both Self-Cleaning and Self-Sharpening. Drive shaft mounted on permanently lubricated sealed bearings. Hundreds of thousands in world-wide use. Buy direct from factory and save. Owners Cooperation Plan can repay cost. **Write today for full details on limited "On Approval . . . Trial Offer". Sold Direct Only.**

MONTAMOWER DISTRIBUTING CO.
PS-46 Keeler Bldg., GRAND RAPIDS 2, MICH.

EXPERIENCED or NOT...

Learn to earn HIGH PAY in 12 weeks!

MODERN AUTOMOTIVE DIAGNOSIS TECHNIQUE

is your Stepping Stone to SUCCESS

611

Prepare for a big income—unlimited opportunity in the vast, ever-growing field of *modern* automotive service—IN 12 WEEKS! SUN, the world's largest manufacturer of scientific automotive test equipment, offers *you* their MODERN AUTOMOTIVE SERVICE course—the *only* one of its kind.

YOU TRAIN in Detroit—The Motor City—at the completely-equipped SUN resident school. Your attention is focused on scientific testing—the only way to avoid guesswork servicing cars.

YOU LEARN basic operating principles and maintenance techniques by working on all types of the *latest* engines, transmissions, brakes, etc.

YOU USE the latest scientific test instruments to observe performance and pin-point trouble.

INVESTIGATE TODAY—take the first step NOW to MORE MONEY, a secure future—and your choice of location when you graduate. Recommended by motor manufacturers. Approved for veterans. *Classes scheduled in Detroit Technical Training Center.*

SEND FOR FREE BROCHURE • ALL DETAILS NO OBLIGATION

Sun Electric Corporation, Dept. PS-254
6323 Avondale Ave., Chicago 31, Illinois
Please send free details on MODERN AUTOMOTIVE SERVICE course.

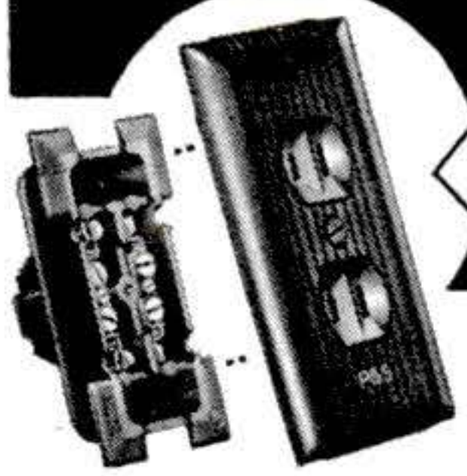
NAME_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

Copyrighted material

Does Your House Need More Electric Outlets?



THIS NEW EASY-TO-INSTALL NO. 500 OUTLET IS YOUR ANSWER

NOW, a first-class duplex outlet that's easy to install. No monkeying with metal boxes—no soldering—no taping. Box and outlet are molded all-in-one of sturdy plastic. **For use with any non-metallic cable. Gives a totally enclosed, completely safe installation.**

Clamp cable in back — fasten wires to terminals — press outlet into wall — bend holding clips into place.

NOT A GADGET—a *real*, high quality electric outlet with the finest contacts available—*plus* modern design wall plate.

EVERYTHING IN A SINGLE PACKAGE—self-contained outlet, clamps for holding in wall—and plate. Easy-to-follow instructions *printed right on the package.*

GET RID OF THOSE DANGEROUS, trailing, tangled cords and make-shift arrangements. Add *real, honest-to-goodness* outlets—in the wall where they belong. Use these modern outlets approved by Underwriters' Laboratories, Inc. for just this purpose.

Fasten plate with single screw. A finished workman-like installation.

Over 60 years of experience in producing the finest electrical products—*your guarantee of a safe, dependable installation.*

Consult your electrical contractor, or use this coupon to order No. 500 direct.

ONLY $1.00 EACH Postpaid

Pass & Seymour, Inc., Dept. PS, Syracuse 9, N. Y.

Enclosed is.....for.....Handy Electric Outlets

Send ☐ Brown ☐ Ivory

Name.....

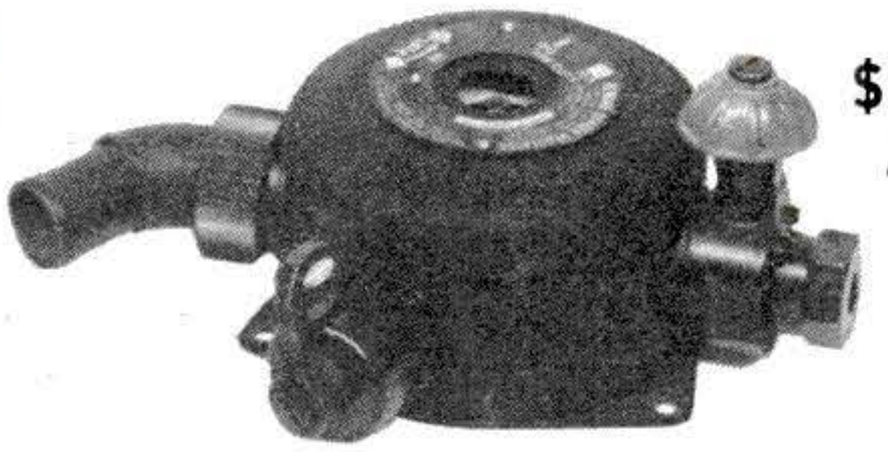
Address.....

City.....Zone....State.....

OXYGEN REGULATORS

Used Government Surplus

A-12 DEMAND OXYGEN REGULATORS



$7.50

Cylinder 24x3¾ ½" opening	$2.50
Cylinder 18½x3¾ ½" opening	$2.00
Valve ½"	$3.00
Tee Fitting	$5.00
Flutter Valves	.40 and .50
Mouth Piece	.65
Hose .....2 Ft.	.40 4 Ft. .65
Clamps	.15

Terms check or 50% deposit and balance C.O.D.

FREE CATALOG

M. A. NORDEN SUPPLY COMPANY

273 N. Washington Ave. Mobile, Ala.

4 WHITE WALLS $9.95

100% NATURAL RUBBER

EASY TO PUT ON!

Turn your present black tires into custom white side walls, with these thick, natural rubber WHITE WALLS. Absolute perfection and satisfaction assured. Everything furnished for all four tires. Mail check or money order NOW. Introductory price for complete kit: only $9.95 postpaid. Sold coast to coast.

Department S

CUSTOM SIDEWALLS P.O. Box 11758 Wagner Station Los Angeles 47, California

IT'S A "HIT!"

Order your revolutionary new "HIT" miniature camera today! Greatest value ever offered in a fine imported camera. Low price includes genuine pigskin carrying case, also roll of film.

Smaller than a matchbox! Precision made, easy to use. Additional films 30c per roll or six rolls for $1.50. Enlarges beautiful 2"x2" prints. Ten exposures per roll. Wonderful gift for young and old.

LOW PRICE OF $4.95

Shipped C.O.D. plus postage charges. Write today to Hit Sales, P. O. Box 524, Maywood, Illinois.

Make Your Own TV REPAIRS!

This Book Can Save You $50 — $100 Per Year

Instructions Compiled Exclusively For Your TV! (Not just a diagram service)

Fix 85% of TV troubles, easy as replacing light bulb! Save $$$! New TV REPAIR GUIDE reveals many "trade secrets" on trouble-shooting, tube replacing, antenna adjustment, *everything.* Makes repairs *fun, easy, safe!* Includes detailed layout of *your* TV. Gives Tube prices—prevents overcharging. State set make, model.

ONLY $1.00 ppd. TV REPAIR GUIDE

MONEY BACK IF NOT WORTH TEN TIMES THE PRICE!

L. S. ENGINEERING, Dept. P-6, Box 4113, North Hollywood, California

POCKET PISTOL

LIFELIKE—SHOOTS BLANKS
NO POLICE PERMIT NEEDED

Looks like regular quality pocket pistol. Precision machined of regular gun steel to close tolerances by German gunsmiths. Has six shot magazine, automatic cartridge ejector and full safety catch. Ideal for home protection, sporting events, theatrical performances, dog training, etc. 3½" long. Weighs 9½ oz. **10 DAY NO RISK TRIAL.** If dissatisfied return for refund. C.O.D.'s require $2.00 deposit. Cash orders pre-paid.

$7.95 Ppd.

UNITED ARMS, 9043 S. Western, Dept. BP-201, Chicago 20

TRAILER TOPICS MAGAZINE

It brings you the latest in Trailer Coaches—Equipment—Accessories—Trailer Trips—Trailer Parks and many other interesting monthly features at only—$3.00 for 2 years.

(6 MONTH TRIAL SUBSCRIPTION $1.00)

TRAILER TOPICS MAGAZINE (Room 1588)
28 East Jackson Blvd., Chicago 4, Ill.

Copyrighted material

WORLD'S GREATEST

CLASSIFIED

OPPORTUNITIES

MAKE MONEY

SAVE MONEY

Here are hundreds of opportunities offered especially to the readers of Popular Science Monthly. Read them. Answer them! You can make and save money.

POPULAR SCIENCE MONTHLY — 353 FOURTH AVE. — NEW YORK CITY 10

Classified Ads only 90c per word per insertion, payable in advance. Minimum ad 10 words. To be included in August issue, copy should be in our office by June 25. No cancellations accepted after June 15th. Address orders to O. K. Kelly, Classified Adv. Mgr.

1 AUTOMOBILES & MIDGET CARS

CHILDS powered automobile, fiberglass, complete, kits. Box 3084-PS, Riverside, California.

HI-Mileage-Speed Equipment from the World's Largest Supplier. Dual manifolds, finned heads, electric doors, lowering sets, fuel savers, thousands of items for all cars. Huge catalog, 25c (Illustrated Literature free). Wholesale to garages. Newhouse Automotive Industries, Los Angeles 22.

CROSLEY Parts, Accessories, Speed Equipment, Tire Recaps, Service Manuals, Parts Books, Club Bulletins, etc. Write for membership details. Crosley Car Owner's Club 2101 Greenway, Charlotte 4, N. C.

WRITE for free sample copy. Franson's Motor News, Eugene, Oregon.

NON-Profit organization offers automobile literature—old, new and foreign; dealer books, service manuals, glossy photographs; free motor magazines. Write today; get on free mailing list. Auto Maniacs, Inc., Stockbridge, Michigan.

FIBERGLAS automobile bodies. Build your own. Maurice Lannon's Fiberglass "How" book—$2.50. Information, materials catalog—10c. Gem-O'-Lite, Box 6868A, North Hollywood, Calif.

ANTIQUE Automobile Color Slides, 2x2. Illustrated Catalog Free. Universal Slide Company, Box 779P Beverly Hills, Calif.

STABILIZE Fords, Mercurys, Lincolns in ten minutes. Write for literature and nearest dealer. $2.75. B&B Specialty Company, 1718 Hawthorne, Houston 6, Texas.

ANTIQUE Auto Prints—Beautiful four-color water color type reproductions for framing, 5½"x8" on heavy stock. Olds, Stanley Steamer, Maxwell, first Model A Ford. Set of four, $3.00 postpaid. Tanncraft, Dept. S6, 4709 Arlington, Fort Wayne, Indiana.

A Better Car For You! New 256-page book, "How To Take Care of Your Car" by famed Popular Science experts shows you easy ways to beat high cost of car care, repair. Over 750 pictures, hundreds of easy instructions on fixing, servicing, saving on gas, more! Guaranteed! Only $2.49. Popular Science, Dept. 654C, 353 Fourth Avenue, New York 10, New York.

2 AUTO SUPPLIES & EQUIPMENT

BRUSH Plating Outfits connect to a battery. No tanks or shop required. Free particulars. Gunmetal Co., Ave. K, Decatur, Illinois.

1954 EDITION. It's New! It's Different! Get world's largest Auto Accessory & Parts Catalog and save money. 132 pages. Over 50,000 items, including Hollywood Accessories Hi-Speed Equipment. Rebuilt Engines, all parts and accessories for all cars and trucks. We have that Hard-To-Get part! Jam-packed with bargains. Completely illustrated. Send 25c (refundable). J. C. Whitney, 1919-KB Archer, Chicago 16, Illinois.

"AUTOMOBILE Accessories", for Free Trial! Write—Neher Industries, LaVerne 6, California.

NEW And Used Parts At Savings. Complete guaranteed parts service for all models cars and trucks, late or old. Largest in the West. Army parts specialists. No catalog—write for quotations. Fast Mail Order Service. Pioneer Auto and Truck Parts Co., 788 W. 13th Avenue, Denver, Colorado.

CUSTOM accessories headquarters. Electric push button doors—trunks, bull noses, custom grilles, speed dress-up equipment. 40 page catalog hundred photos—25c. Eastern Auto, 3319A South Grand, Los Angeles 7, Calif.

SAVE your life with amazing new "Torsion-Flex" Sway-Bilizers! Stops sway, skid, slide. Postal brings free illustrated literature, gift offer. Sway-Bilizer, 5434-B Higgins, Chicago 30.

NEW!! Different! Economy Safety catalog featuring complete national selection of latest improved inventions. Fully illustrated . . . unconditionally guaranteed. Many free, free, send no money offers. 50c refunded on first purchase. Mehren Industries, 8666 West Pico Blvd., Dept. S-3, Los Angeles 35, Calif.

SENSATIONAL German Discovery. Vulcanize tire tubes—no heat—no equipment needed. Not cold patch. $3.25 brings sample set-up. Automotive, 273 Grand Ave., New Haven, Conn.

FOR a better motor for $3.00. Write Ferns Products, 8120-D Walnut Drive, Los Angeles 1, Calif., for free data.

CADILLAC, Buick, Olds, Pontiac, to 1949 stop that skip. Save gas. Get new power with Spark-O-Liner. 3½ million sold. Get one today from your parts jobber. Free literature. Hove, 5606 Clinton, Minneapolis 19.

FORD-T Parts—Engine and chassis. Parts for other old models. Special parts made to order. B. S. Wisniewski, Milwaukee 7, Wisconsin.

IONIC Process cooling system cleaner. Ion-20 gives scale-free engine. Eliminates vacation overheating. Free Literature. Send $3.00 m.o. or check. Wong Laboratory, 3259 Madison, Cincinnati 9, Ohio.

RAELILE Pistons any make or model. Complete Piston Service, Upland, Calif.

STOP noises from sticking valves or hydraulic lifters! Overhead oiler lubricates upper engine parts—stops noises! $6.95. Money-back guarantee. Fields, Box 171, Phillipsburg, N.J.

ADD Extra Life to your engine by adding Hoppy Friction Reducer to your oil $2.00. Box 5071, Detroit 31, Michigan.

INSURE your car against fire. Send $1.98 for Stop-Fire Extinguisher. Glove Compartment Sized. Joe Pygman, Box 882, Coca, Florida.

BUY Wholesale nationally advertised auto supplies, thousands other products at big discount. Free "Wholesale Plan." American Buyers', 629-E Linden, Buffalo 16, N. Y.

CAR Burning oil? Losing compression? Try Clifford's Compression Seal. $2 postpaid. Clifford's Engineering, 1329 Seventh, Aurora, Illinois.

AIRCRAFT 2" Safety Belts, 41" long, blue, $2.50. Pierlot, 1010 South Fir, Inglewood 1, California.

ELECTROPLATE autoparts, novelties, mirrors. Easy, inexpensive home processes. Free booklet. Tyco Metals, Box 13231-FC, Houston 19, Texas.

CHEVROLET Owners: Stop tappet noise with Kaye Tappet Silencers. Quality product. Easy to install. Complete set $5.95. Kaye Products, 2067C So. Layton Blvd., Milwaukee, Wisconsin.

INCREASE! Gasoline mileage Three to Five more miles per gallon. Guaranteed Gasoline Vaporizer, also Increases Power. Easier starting. $3.50. Turb-O-Vane, Stockton, Calif.

SENSATIONAL Free Trial Offers! Surplus stock of famous Gale Hall automotive instruments, brand new, original cartons! Try at our risk for seven days—then send payment or return merchandise! Professional Compression Testers, originally $10.75, now $2.98! Terrific combination Vacuum Gauge/Fuel Pump Tester, originally $8.10, now $3.09! Original Gale Hall motor condition/gasoline economy gauges for permanent dashboard mounting . . . originally $7.50, now $2.98! (Add 40c to each price for postage.) Order Now! New England Surplus Sales, Dept. PS-6, Newburyport, Mass.

MOTORIST Save Gasoline by Vacumating overrich mixtures. Fits all cars. For free particulars write Vacumatic, Dept. 2072, Wauwatosa, Wisconsin.

CONVERTIBLE Tops—Black, Tan, custom made $27.95. Send make, year, model. Florida Top Shop, 7325S Old St. Augustine Rd., Jacksonville, Florida.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The August issue closes on June 25. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 554, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

3 AUTO TRAILERS

BUILD your own trailer! Plans for all kinds. Illustrated catalog 10c. Jim Dandy, 125-S, Wausau, Wisconsin.

ASSEMBLE Yourself. Trailer Kits. Pick-up Coach Kit. Blueprints. Literature 10c. Comstock Trailers, 585-SK, Parsons, Kan.

4 MOTORCYCLES, BICYCLES AND SUPPLIES

NSU and BMW Motorcycles. 1½ to 35 HP. Singles and Twins. Chaindrive and Shaftdrive. Some Dealerships open. Butler & Smith, P.O.B. 45, New York 24, N. Y.

MOTORBIKES—Gasoline engines. Mowers. Factory catalog 10c. Lenco, Box 436, Danville, Illinois.

REBUILT gasoline engines $17.00 to $37.00. Cauffiel Motor Industries, Temperance, Michigan.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

MIDGET Auto $45. Villiers motorcycle $35. Cushman less motor $25. Whizzer motorbike $35. Whizzer motor $5. (Mail-order only). Send 25c for Directory Number 59, listing these and hundreds of other bargains in new and used midget cars, motorscooters, engines, parts, plans for homebuilders, etc. (35c by first class mail). Midget Motors Directory, Athens, Ohio.

RECONDITIONED motorcycles and motors. Chromium accessories. Complete stock Indian parts. Expert rebuilding. Fast service. Indian Motorcycle Sales, Kansas City 27, Mo.

WHIZZER motorscooter $20.00; two-speed Cushman motorscooter $20.00; Indian Scout motorcycle $40.00; midget car $15.00; homemade motorscooter $6.00. Send 25c (35c first class mail) for catalog #25 jammed with sensational bargains in wheels, motors, motorscooters, midget cars, motorbikes, construction plans, etc. Gail, 1313 Jefferson, Toledo, Ohio.

5 AVIATION

BUILD a Helicopter Jet Engine Yourself! "Practical Ram Jet Design"—$1.00. Decker Engine Works, Plasterco, Virginia.

PROPELLERS, plans, kits for air boats, snow sleighs. Immediate delivery. Catalog 25c. Banks-Maxwell, Box 3301G, Ft. Worth, Texas.

6 BATTERIES, GENERATORS, ETC.

EDISON Nickel odorless storage batteries, 12 to 600 ampere hour. Any voltage Long guarantee. Literature. Hawley Smith Co., Croton Falls 2, New York.

7 ELECTRICAL SUPPLIES & EQUIPMENT

LAMPS—25c brings bargain catalog showing all parts for repairing, building. Contains instructions for electrifying vases, oil lamps, etc. Gyro Lamps, 5402B Clark, Chicago 40.

DEPTH gauge; clamps to frame of 1/4" electric drill, with wing nut. Suitable for any bit. $2.50 postpaid. Harvey Seiders, Halifax, Penna.

8 WELDING, SOLDERING

WELDERS — electric — various models. $28.50 to $235.00 direct from manufacturer. Free literature. Champion Welder Mfg., 193PS Centre St., New York 13, N. Y.

ACETYLENE Welding Outfits new $49.00. Used $29.00; Arcwelders $49.50. Eagle Welding, Dept. 42, 5085 Broadway, Chicago 40, Illinois.

"BUILD-Ur-Own" a.c. welder and a.c. power plant with a good used engine and low cost Hobart generator. Welds anywhere and supplies 5KW stand-by power for any emergency. Write Hobartweld, Box P-643, Troy, Ohio.

SOMETHING New! Use reverse polarity rods with A-C welder, aluminum, stainless, fleet5, Hface, etc. "Rectark" plans—$2.00. (copy name plate.) Phillip Wilson, Childersburg 2, Alabama.

WELDERS 110V, $29.50, 220V, $49, combination $54. Morris, 1070 Inner Drive, Schenectady, New York.

9 MACHINERY, TOOL SUPPLIES, ETC.

ALLEN One Ton Power Bench Type Punch Press, $97.50. Circular. Allen, Dept. PSB, Clinton, Missouri.

SMALL Lathe boring table or backplate castings. Lay Tools, Norcross, Georgia.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The August issue closes on June 25. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 554, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

FORGED Steel drift pins, scratch awls: —7/16", 3/8", 5/16" x 6" long—3 for $1.50 Post Paid—Pacific Tool, Box 86, Paramus, New Jersey.

NEW All Steel Drill Press Vise, 3½" Hardened Jaws. $9.95. Money Back Guarantee. Free Circular. B. M. Sypher Co., 206 Cherry St., Toledo, Ohio.

10 ENGINES, MOTORS, ETC.

WINDING Data, listing 225 motors, single and three phase. $1.00. Motor Data, Box 7631, Kansas City 28, Mo.

REBUILT Gasoline Engines, $17.00 to $37.00. Cauffiel Motor Industries, Temperance, Michigan.

ALTERNATING Current Generators 750 watt $38.50. 5000 $185.00. Motors 1 horse $37.50. 2 $67.50. 3 $87.50. Butler, 1885 Milwaukee, Chicago 47.

11 BOATS, OUTBOARD MOTORS

BUILD marine engines with Federal Conversion Kits. Federal Marine Motors, 9011 Cottage Grove Ave., Chicago 19, Ill.

NEW, used rebuilt marine motors. Marine conversions, fittings. Free Catalog. Stokes Marine Supply, Dept. 23, Coldwater, Mich.

OUTBOARD Motor Parts—New—Used for all makes. Send stamp for price quotation, listing parts needed. Outboard Motor Mart, Inc., 229D State Street, Boston, Massachusetts.

"HOW To Make Your Old Boat New With Liquid Glass" and "How To Build Your Own Fiberglass Boat". These 2 illustrated manuals show step-by-step method. Both for 25c from Marine Div., Dept. MG-102, Castolite, Woodstock, Ill.

FULL size, cut-to-shape Boat Patterns, Blueprints. 7½-38 feet. New 1954 illustrated "Build A Boat" catalog of 50 naval architect-designed Cruisers, Runabouts, Sloops, Skiffs, Outboard Boats, Sailing, Racing, Houseboats, 50c. Marine Hardware Catalog, $1.50. Bigger, better 1954 "How to Build Boats" book, $2.50. Polywog Houseboat Plans, $12. Cleveland Boat Blueprint Co., Dept. A-77, 9400 Steinway, Cleveland 4, Ohio.

RUBBER Boat Bible with Prices 10c. Ort, Thomasville 564, Penna.

FREE Catalog! Boat Kits, Trailers, Fiberglas, Marine Hardware. Luger Industries, Dept. MD, 3207 Fremont South, Minneapolis, Minnesota.

MARINE conversions for Ford and Jeep engines. Catalog 10c. Lehman Manufacturing Co., 972A Broad St., Newark 2, N. J.

BUILD Beautiful fiberglas-plastic boats without using molds. New patented method. Write Speedcraft, 2450 Emerson, off Square Lake Road, Pontiac, Michigan.

BUILD a 21 foot plywood outboard cruiser, also other plans including a sailing catamaran, literature free. Widd Hauber, 2451 18th Avenue, No., St. Petersburg, Fla.

BUY Wholesale nationally advertised outboards, thousands other products at big discount. Free "Wholesale Plan." American Buyers', 628-E Linden, Buffalo 16, N. Y.

FIBERGLAS permanent boat coating. Maurice Lannon's Fiberglass "How" book —$2.50. Complete catalog—10c. Gem-O'-Lite, Box 6868B, North Hollywood, Calif.

FIBERGLAS lifetime boat covering. Average 12 foot boat costs only $27.50! Free information. Northwest Fibr-Glass Company, 1531 North Morgan, Minneapolis 11, Minnesota.

AIRPLANE Floats (Pontoons) for Boats. Catalogue 10c. Ort, Thomasville 568, Penna.

BOAT Kits, plans and patterns for America's fastest and finest outboard racers, runabouts, hunting skiffs, canoes, and fishing boats. Illustrated literature 25c. Schneider Boat Co., Dept. PS, 1913 West Vliet, Milwaukee 5, Wisconsin.

AIR boat plans, kits, supplies. Catalog 25c. Banks-Maxwell, Box 3301J, Ft. Worth, Texas.

LIFEGARD life preserver puts safety right at your fingertips. Inflates instantly with a quick squeeze. Floats you safely for hours. Light, compact—of finest latex. Fastens to belt or clothing. Reloads in a jiffy—can be used repeatedly. Complete with two cartridges $6.50. Extra cartridges 40c. Comes postpaid. LifeGard Sales, Box 2757, Denver.

NONCORROSIVE screws, studs, nuts, washers and specialties reasonably priced. R. Freas, 1012 Maple Street, Conshohocken, Penna.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The August issue closes on June 25. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 554, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

12 BODY-BUILDING COURSES, JIU JITSU & ATHLETIC EQUIPMENT

BARBELLS, Dumbbells, Exercise equipment Courses. Free booklet. Good Barbell Co., Reading, Penna.

GREAT Strength easily obtained, see Page 42 Popular Mechanics May Issue 1954.

14 FIELD GLASSES, TELESCOPES

FREE Catalogue! Thousands war surplus optical bargains. Lenses, Prisms, Telescopes, Binoculars, etc. Send $1.00 for 10 Lens Hobbyist Set and Project booklet. G. Jaegers, 691 West Merrick Road, Lynbrook, New York.

SAVE 25%! Get interesting facts. Free 52 page Binocular, Telescope Catalog. $3.95 to $250.00! United, 9043 S. Western, A-9016, Chicago 20. Dealers Wanted.

IMPORTERS' amazing prices, binoculars, microscopes, gunscopes. Free trial. Folder, "Binocular Selecting", pricelists free. Dealers wanted. Prentiss Importers, Mercury Bldg., West Los Angeles 25, Calif.

8X FINDER Scope, $1.00. "Beginners Astronomy." 25c catalog, kits, supplies. Telescopic Supply, Box 685, Dallas, Texas.

WAR Surplus Bargains! Millions of lenses, instruments, telescopes, binoculars, components! World's greatest optical market place! Send only $1.00 for beginner's 10-Lens Kit & big Instruction Booklet, Stock CN. Write for Catalog CN Free! Edmund Scientific Corp., Barrington, N. J.

TELESCOPES, Microscopes, Binoculars for quarter century. Big bargain scientific catalog 10c. Harry Ross, 70 West Broadway, New York 7, N. Y.

DYNASCOPE sensational new telescope, send for full details. Criterion Co., Hartford, Conn.

SPECIALISTS. Used, new microscopes. Prepared slides. Supplies. Telescopes. Free illustrated catalog. Nassau Optical, 9 W. Greenwich, Roosevelt, New York.

BINOCULARS—Telescopes, Microscopes. Terrific values $3.98 up. Request Free-Money saving catalog. Criterion, Hartford, Conn. Dept. S22.

REFLECTING Telescopes, completely assembled. 60X. $29.75. Guaranteed Observatory clearness. Free information. Skyscope, 475 Fifth Avenue, New York 17.

THE Galileo—imported 30x40 precision Telescope at unheard of low price. Free literature. Gustav-Martin Corp., Dept. C, 622 Dalton, Northbrook, Illinois.

PANORAMIC Telescope, Army surplus $12.95, original government cost $800.00. Send for free picture. Also range finders, sextants. Farber Products, 226-P Lafayette St. New York 12.

REFLECTOR Telescope Kits from $6.25. All parts designed and built at our Hoboken factory. Mirror Cells, Diagonals, Focusing Mounts, Tripods, Tubing Oculars. Fully guaranteed. Free illustrated catalog. Send orders and inquiries to Esco Products, Dept. PS-1, 1428 Willow Avenue, Hoboken, N.J.

Copyrighted material

REFLECTOR telescope mirrors. Write L. Henderon, 4807 So. 7th, Tucson, Ariz.

TELESCOPE kits and accessories, mirrors aluminized, ground to order, instructions 10c. Garth Optical, Box 954, G.P.O. N.Y.C. 1, N.Y.

GIANT 100X day and night telescope. Steel and brass tube construction. Complete with two eyepieces, helioscope instructions, extra heavy tripod—$7.50. Other telescopes at $12.00 and $16.00. Free information. 400X telescope makers kit contains brass focusing tube, erector, 5 lenses and instructions—$3.75. Suffolk Science, Riverhead 4, New York.

LOWEST prices all sizes Binoculars, Telescopes, Microscopes 8x30 $32.00, free catalogue. Joe's Binocular Sales, 4827 Second Street, Detroit 1, Michigan.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The August issue closes on June 25. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 554, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

15 SPORTING GOODS, GUNS, FISHING TACKLE, ARCHERY, TRAPPING

180 PROFUSELY illustrated pages, antique pistols, swords, daggers, armor, etc. 50c. Robert Abels, PS860 Lexington Ave., New York 21.

CAST Iron Sinker Molds—for making your own sinkers. Free illustrated booklet. Reading Instrument Co., Box 78, Reading, Pennsylvania.

KNOW when to get the fish. Send 25c —Zodiac Fish Guide—best yet. Morrell, 50 Penna. Elmira, N. Y.

FREE copy! The Archer's Magazine. Request: 1200 Walnut Street, Philadelphia 7, Penna.

MOLDS for Fisherman's Sinkers, Jigs, Squids, Casting and Spinning Lures. Free Catalogue. Sweet's Molds, Tonawanda 3, New York.

5,000 BARGAINS, firearms, binoculars, war relics, catalog 50c. Smith Museum, Runnemede, N. J.

FISH bait oil formulas for sale. Old Asiatic Compound You Can Make. Ingredients purchased from local drug store. 2 formulas tried, tested for bottom or shallow fishing. $1.00. John Hastings, 1274 W. 102 Street, Cleveland 2, Ohio.

GUNS!!! 2000 New-Used. Colts-Kentuckies - Winchesters - Lugers - Swords - Flasks - Shooters Supplies. Ammunition-Bargain Catalog 50c. Agramonte's, 201 Warburton Ave., Yonkers 2A, New York.

HIKERS, etc!! Genuine U.S. Army surplus Lensatic Compass. Officer's precision instrument. Hooks onto belt. Free!—water repellent cover. Reg. $5.95. $3.00. No C.O.D. Miller's Surplus, 108 S. Euclid, Ontario, Calif.

IMPORTED Daggers, Throwing, Pocket, Hunting knives, etc. Free catalog. J. D. Clinton, 94 Church, Mt. Clemens 3, Mich.

BUY Wholesale nationally advertised sporting goods, thousands other products at big discount. Free "Wholesale Plan." American Buyers', 627-E Linden, Buffalo 16, N. Y.

JAP rifles altering American shells $6.00, catalog 5c. TP Shop, West Branch 10, Michigan.

SAVE 50% on finest bows, arrows, complete bowhunting outfits, etc. Free Catalog and "How to Hunt with Bow and Arrow" booklet. Send 25c for handling. Malibu Archery, 3156-F 8th Street, Los Angeles 5, California.

SWIMMERS! Send $3.95 for Imported French Mask. Skin Divers' Catalog 25c. Aquafun, Davenport 5, Iowa.

SUBPLANE—Frogman subsurface aquaplane, circular 10c, plans $2.50. Complete $78.50. Service Engineering, 7959 Sparling Road, Goodells, Michigan.

CATCH fish the easy modern way!! The fish come to you. A scientifically developed and proven bait. Experts agree. Satisfaction guaranteed. $1.00 to 1000 Islands Enterprises, Clayton 23, New York.

16 CAMPING EQUIPMENT & TENTS

SLEEPING bags, tents (direct from manufacturer), air mattresses, camping equipment. Low prices. Send 10c for 72 page illustrated tent-camping equipment-tent maintenance catalogue. Mor-San Sales, 10-21G 50th Avenue, Long Island City 1, New York.

TENTS. Complete line, all purpose, low prices. Send for list. Delano Studios, Suite PS, 31 E. 18th Avenue, Denver 2, Colorado.

17 DOGS, BIRDS, HAMSTERS, RABBITS & PETS

MAKE Big Money! Raise Chinchilla Rabbits. Cash Markets Supplied. Write Today! Rockhill Ranch, Sellersville 16, Pa.

ORIGINAL Drawing made from favorite photograph of your Dog. Everlasting keepsake. Write for free information. Earle Littlejohn, 201-PS East Earle, Greenville, South Carolina.

RAISE moneymaking Angora, New Zealand Rabbits. Particulars free. White's Rabbitry, Jackson, Michigan.

CHINCHILLAS (no rabbit) easily raised. Profitable. Big future. Terms. Cliff's Chinchillas, Ithaca, Michigan.

HAMSTERS—golden; young, $4.00 pair; fully developed, $5.00 pair. Adirondack Hamstery, Prospect 21, New York.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay $3.50 lb. We paid Babbitt $4,165.00 in few weeks. Free Book. Washington Mushroom Ind., Dept. 177, 2954 Admiral Way, Seattle, Washington.

ALBINO Hamster, young breeder. $5 a pair. Mrs. Bernat, 986 Leroy Avenue, Akron 7, Ohio.

ANGORAS, Chinchillas, White Giants! World's most profitable rabbits! Catalog free. Grinstead's, Edwardsville, Illinois.

RAISING Guinea Pigs brings $7,000.00 annually to us. Booklet free. Taylors, B426B, Hapeville, Georgia.

REALLY interested in buying live snakes? Write Pic's, Richland, Georgia.

HAMSTERS—Golden; Grown, $4.00 pr. Young $2.50 pr. Free information on Albinos. Circle S Hamstery, Box 183, Claymont, Delaware.

"MONKEYS, Their Training, Care and Feeding," new booklet describing 30 most popular varieties. 25c postpaid includes importers price list. Tropical Hobbyland, 1531 N.W. 27th Ave., Miami, Florida.

19 FARMS, OTHER REAL ESTATE

FARM-Ranch Opportunities. Favorable conditions. Washington, Minnesota, Montana, Idaho, Oregon, North Dakota. Literature, farm descriptions. Specify which state. J. W. Haw, 120 Northern Pacific Ry., St. Paul 1, Minn.

CALIFORNIA Ranch Lands. 50c to $5 acre minimum bid. Farm-ranch-hunt-fish-retire. 10c brings illustrated land catalog, outline maps. Tax Land Sales, Box 2350BX, Hollywood 28, Calif.

STROUT Catalog—Mailed Free! Farms, Homes, Businesses, 34 States, Coast-to-Coast. 3240 Bargains described. World's Largest; 54 years Service. Strout Realty, 255-ZB 4th Ave., New York 10, N. Y.

HOUSTON is the fastest growing city in America. Come here Now and profit from its fortune-making future. Beautiful Homesites in desirable Suburb for only $345—easy terms. Booklet Free. Nathan Wood, Box 413, Houston, Texas.

VILLAGE Homes, easy payments, nothing down Details. Perry, Breirhill, Pa.

21 POULTRY & SUPPLIES

RAISE pheasants on $100 week plan. Little capital and space can make you independent. Free details. Great Central System, Columbus 6, Kansas.

22 PROFITABLE OCCUPATIONS

DETECTIVES Earn Big Money. Excellent opportunity. Detective Particulars free. Write Wagoner, P-125 W. 86th, N.Y. 24.

"HOW to Make Money With Home Workshop" describes amazing methods used by hundreds of successful craftsmen. Tells what to make. How to sell workshop output spare time. Write at once for details. Craftsman, 115B6 Worth St., NYC.

$10,800 PROFITS! Your Own Mailorder Business! No Risk! "Success Plan" Free! Treasury, 709 Webster, New Rochelle P-24, New York.

$500,000 BY mail from home. Free Folder. Publicity, Kalamazoo 65ES, Mich.

$5000 FROM Half Acre growing Ginseng, crop bought. Particulars 10c. Associated Growers, Sperling, Manitoba.

FOREIGN Employment Construction Work. If interested in foreign projects with high pay, write Foreign Service Bureau, (Dept. P.S.), Metuchen, New Jersey.

FREE! "301 Profitable Small Businesses!" Amazing shoestring plans! Work Home! Start Sparetime! Deumant Surveys, Kenmore 23-T, New York.

BUILD luggage and cases at home. We sell your products. No special equipment needed. Free details. Casecraft, 805-X12 Sunset Blvd., Los Angeles 12.

ADDRESS Advertising Postcards. Must have good handwriting. Box Nine, Watertown, Mass.

RAISE Mushrooms. Any climate. Summer-winter. Manureless methods. Tremendous profits. Liberal sample of Ready-to-Grow mushroom spawn with growing instructions 50c. PMSCo., Box 475-K, Wilkes-Barre, Penna.

OWN A Collection Agency, pays big. Franklin Credit, Roanoke 7, Virginia.

WELDING Pays $$$. Learn easily at best equipped school in country. Non-profit School with low cost training. G.I. approved. Write Hobart Trade School, Box 642, Troy, Ohio.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay $3.50 Lb. We paid Babbitt $4,165 in few weeks. Free Book Washington Mushroom Ind., Dept. 101, 2954 Admiral Way, Seattle, Wash.

START "Silverware Renewal Service." Franchise. Exclusive. NuSilver, 508-PS6-PO, Aurora, Illinois.

HOME Mailorder Beginners. Sources, methods, information, instructions. 25c. Carnahan Bros., 5582-B Nelson, Cypress, California.

"EVERYBODY Likes Candy." Learn to make professionally. (Our 43rd year.) Ragsdale Candies, East Orange, N. J.

BUY Wholesale thousands nationally advertised products at big discount. Free "Wholesale Plan." American Buyers, 628-S Linden, Buffalo, New York.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The August issue closes on June 25. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 554, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

NOVELTY Manufacturing of Ash trays, Book ends, Figurines pays excellent profits. No expensive molds needed. Plastex, Box 167-B, Falls City, Nebraska.

Copyrighted material

MUSHROOMS grown boxes, barrels. Manureless process 50c. Spawn $1.00. Gordens, 553 William, Winnipeg, Manitoba.

FREE Book "505 Odd, Successful Businesses." Work home! Expect "Odd"! Pacific—37C, Oceanside, Calif

PANNING Gold prospecting catalog, listing maps, mineral books, gold pans, panning lesson free. Old Prospector, Box 729D2, Lodi, California.

23 BOOKS & MAGAZINES

SPARETIME Profits Taking Subscriptions. All Magazines. Wholesale Catalog Free. Cassell Agency, Westfield 1, N. J.

GOOD Used Books, 50c-$1.00. Free lists. Editions Dept. PS, Hempstead, New York.

"HOW-TO" books—advancement, education, hobbies, health, travel, other subjects. List, 100 titles, 25c. Guidance Associates, 1714 Ocean Parkway, Brooklyn 23, New York. Established 1938.

BOOKFINDERS! All subjects. Send wants! Plymouth, Box 365-A, Far Rockaway, New York.

SCIENTIFIC Wheat Course: "Secrets of Wheat Trading"—Pugh's Publications, Box 24, Ambass. Sta., Los Angeles 5, Calif.

BOOKHUNTERS! All Subjects. Send Wants! Jaher Book Service, 620-K East 178 Street, New York 57.

NATIONAL Geographic Magazines 1888-1952. Any issue. Periodical Service, Box 465-PS, Wilmington, Delaware.

ATHEIST books. Catalogue free. Truth Seeker Co., 38 Park Row, New York 8.

ESOTERIC Curiosa, Rare Adult Books, Manuscripts Pamphlets, Readers, Booklets; English, French, German. Indicate title, author or subjects desired. Send stamped envelope for reply. Francene, Box PS-7, 949 Broadway, New York 10, New York

HOBBY Homecraft Directory. Reviewed by leading magazines. The answer to Hobbyists' and Home Craftsmen needs. Just $1.00 for 1550 sources supplies. 212 chances to regain your dollar. Order Now. Lewis Turley, Sidney 6, Ohio.

BIG Catalog. 1500 Bargains, send 10c. Books Publishers, Amityville, New York.

24 HYPNOTISM

FREE Illustrated Hypnotism, Selfhypnosis, Catalogue. Write: Hypnotist, 1324 Wilshire, Hollywood 17P, California.

LEARN Hypnotism. You can—anyone can in one week with our unbelievably simple course. Free details airmailed in plain sealed envelope. Specco, Box 345-K, Wilkes-Barre, Pa.

LEARN Hypnotism, Mindreading, Jogaism, Muscletraining, Memorytraining. Book Free! School for Success, Sparta-D, Mich.

MECHANICAL Hypnotist, new invention causes trances immediately. Instructions, secrets included, $2.00. Clicke, G.P.O. Box 1312, New York 1.

AUTOHYPNOSIS folio, "25 Hypnotism Lessons" and catalogues, 25c. Lloyd Collins, Appalachia, Virginia.

25 MAGIC TRICKS, PUZZLES, ETC.

MAGICIANS, Gamblers books, supplies exposed. Free Catalogue. Book, Box 671, St. Louis 1, Mo.

E-Z Magic Catalog with surprise gift 25c. Eastern, P.O. Box 63, No. Westport, Mass.

BE A Ventriloquist. Surprise friends. All secrets revealed in our complete course. Professional ventriloquist dialogues, monologues for your act. Also Ventriloquist Dummies, low price, fine quality. Send $1 for pictures and information. (Deductible first order.) Experimental Specialty Mfg. Co., 218 N. Jefferson Street, Hartford City, Indiana.

500 TRICKS. Douglas famous 120-page Catalog, only 10c. Fastest service to magicians for 30 years. Send 10c today. Douglas Magicland, Dept. 2, Dallas, Texas.

FREE Magic & Novelty Catalog, includes 14 wonderful magic tricks fully illustrated and described. Read all about our Free Gift Offer. Chicago Magic Center, PS-6, 19 W. Randolph Street, Chicago 1, Illinois.

VENTRILOQUISM Easy to learn in 60 to 90 days! Home Study Course! Results Guaranteed. For free information write stating your age. Dummy catalog 25c. Fred Maher School of Ventriloquism, Box 36, Studio PS-6, Kensington Station, Detroit 24, Michigan.

BE a Magician. Large professional magic catalog of latest tricks 35c. Ireland, F-109 North Dearborn, Chicago.

2500 TRICK Catalogue (512-pages), pocket, parlor, stage. World's Finest Magic. Catalogue $2.00 (dollar trick included free). Kanter's, S-1311 Walnut, Philadelphia 7.

FREE Catalog. Best Magic. Practical Jokes. Top Hat Magic, Evanston 22, Ill.

LATEST Puzzle sensation HI-Q Reg. $1.00 now 89c. Send check. M.O. Webber Sales Company, 120 Harmon Street, Brooklyn 21, New York.

26 COINS & CURRENCY

GET Profit and Pleasure in collecting old coins. Send 10c for 56-page illustrated coin catalog. You'll be delighted with it. Send for it now. B. Max Mehl, 374 Mehl Building, Fort Worth, Texas. Largest rare coin establishment in U. S. Established 54 years.

FREE! Foreign coin banknote and Coin Collectors' Illustrated Catalog to approval service applicants. Send 3c postage. Tatham Coin Co., Springfield-50, Mass.

HAWAIIAN shell money collection, 50c postpaid. Pupuhale, 252 Dewey Way, Honolulu, Hawaii.

UNITED States Rare Coin Value Guide. 48 pages 10c. Fortunes in rare coins. Ideal, 4644-S Geary, San Francisco 18, Calif.

OLD Money Wanted. Will pay $100.00 for 1894 Dime, S. Mint, $50.00 for 1913 Liberty Head Nickel (not Buffalo). Big premiums paid for all rare coins. Send 4c for Large Coin Folder. May mean much profit to you. Numismatic Co., Dept. 30, Fort Worth, Texas.

JAPANESE Invasion notes for U.S. 1c to $1.000.00 set $1.00. 100pp. Catalogue 25c Shultz, Salt Lake 10, Utah.

COIN Magazine, 100 pages. Sample 30c. Numismatic, 7320 Milwaukee, Chicago 31.

100 DIFFERENT Bills $1.00. Grady Berry, 1705 Cobb Street, Columbia 4, S. C.

IRISH Set eight animal coins, in green case $2.95. Everything in coins, currency, books, supplies. Fast service. Giant Catalogue 35c. Bebee's, 4514 North 30th, Omaha 11, Nebraska.

UNCIRCULATED Canadian Queen Elizabeth set 1c to $1.00 for $3.00. Same 1c to 50c only $1.50. Six different US Indian-Head Cents for 25c. Price lists of US and foreign stamps and coins free. No approvals sent. Bryson Stamp Co., 612 White, Toledo, Ohio.

WORLD'S Greatest Magazine for coin collectors and wooden nickel 10c. Lawrence Brothers, Anamosa, Iowa.

100 DIFFERENT Foreign Bills—$1.00. Free list. Dwight Musser, Dunbar, W. Va.

LARGE cent 2c, 3c, all for $1.00. Bargain list included. Delmaco, Box 1123B, Wilmington, Delaware.

27 OLD STAMPS WANTED

CASH for confederate and old U.S. stamps. Harrod, R-3, Galion, Ohio.

28 STAMP COLLECTING

200 DIFFERENT, including Roosevelt triangle, 10c to approval applicants. S. Avalon Stamp Co., Springfield, Mass.

FREE—Complete set of Famous Americans, Flags, Parks and Presidentials to approval buyers. Send 5c for 15 of the above stamps plus full particulars. Triboro Stamp Company, 145 Nassau Street, Dept. 206, New York 38, N. Y.

POLAR Bear Triangle; Giant George Washington, Six Colored Ecuador, Arctic Triangle, first American commemorative, Corsica, Devils Island, others. Everything free with approvals. Capital Stamps, Little Rock 10, Ark.

65 ALL Different U.S. Stamps. Includes 50 yr. olds, commemoratives, airmails and $5.00 Stamp. Only 10c. Approvals. Willett Co., Box 511-M, Port Chester, New York.

AMAZING Offer! 200 United States stamps—including commemoratives, airmails, high denominations to $1.00—only 10c to Approval Applicants!! Illustrated Bargain Lists free. Mystic Stamp Co., Dept. 55, Camden, New York.

FREE Stamp Collection:—100 different stamps from Europe, Africa, Asia, Scandinavia, Balkans, etc. 3c to approval applicants. Tatham Stamp Co., Springfield 50, Massachusetts.

327 DIFFERENT Stamps 25c! Including early Canada, Newfoundland, British Colonies, Vatican, Red Russia, Hitler Heads, Indian States, Animals, Airmails, French Colonies, Rarities, Unusuals. Every Stamp different. Rare bargain with approvals. Money back guarantee. Niagara Stamp Co., Niagara-on-the-Lake 62, Canada.

225 STAMPS For Only 10c! This mammoth value includes Airmails, Pictorials; stamps from strange Countries cataloguing up to 25c each! Also approvals. Mystic Stamp Company, Camden 55, New York.

"WOW! 153 All Different Germany, 10c" Zeppelins, Semi-Postals, Airmails, High Values, Big Bargain lists and approvals included. Jamestown Stamp, Jamestown 509, New York.

SAVE Money! Buy stamp packets. Worldwide selection. Bargain lists free. Webb, 2200 Quintara, San Francisco 16, Calif.

300 DIFFERENT given free with approvals. Postage 3c. Windsor Stamps, 8834 S. Cornell Ave., Chicago 17.

50 DIFFERENT Juventute stamps $1.00. Ernst Schmid, Hauptpostfach 255, Zurich, Switzerland.

FREE—Valuable Illustrated Catalog. Over 1100 special offers, attractive Bargains! Approvals. Kenmore, Milford9C, N.H.

NUDES Set colorful approvals—10c! Atlas, 2830-P Eisenhower, Racine, Wisc.

COLOSSAL Stamp Zoo 10c. Jungle Beasts, Wildlife, Domestic animals—Fifteen different, including Rhinoceros, Elephant, Snake, Tiger, Zabu, Kangaroo, Koalabear, Emu, Kookabura, Bull, Horse —Extraordinary accompanying approvals. Send 10c For Postage And Handling. Niagara Stamp Company, Niagara-on-the-Lake 52, Canada.

329 DIFFERENT Worldwide Stamps 25c, including Hitler Heads, British Colonies, French Colonies, rarities, unusuals. Everything complete 25c to adults requesting approvals. Canada Stamp Co., 1907 Main St., Dept. 119, Niagara Falls, New York.

TRIANGLES, 11 different, each a giant bi-color stamp. A real 50c value for only 10c to those requesting our jumbo approval selections. Wolverine Stamp Service, Dept. B-21, Fruitport, Michigan.

FREE: Mint British Colonies from Tonga, Seychelles, Brunei, Transjordan, Sarawak, Solomon Islands, Caymans, Gilbert Ellice—Free with approvals. Viking, 11-P Northern Blvd., Great Neck, N. Y.

HOW Many of your album pages need only a few stamps to complete? Want to fill those pages? Try our big approval books of 1,000 varieties at 1c and 2c each. Our values will amaze you. Write today. Roseland Stamp Co., Dept. B-31, Spring Lake, Michigan.

Copyrighted material

COLONIAL Collection Free—Magnicarocious collection. British, French, American and other Colonies. Flowers. Animals. Commemoratives. Triangles. Pictorials. High Values all free "plus" Philatopic Magazine. Send 5c for postage. Empire Stamp Company. Dept. PR. Toronto, Canada.

GIANT collection! Over 200 different stamps including Timor, Rhodesia, Mauritius, etc. Rushed, only 10c to approval applicants! Evden, Box 128, Valley Stream 34, New York.

MIDGET Triangle — Giant Diamond. Rhino, Greenland, 28 others. 3c Approvals. Vidal, 3396 Alta Vista, Cincinnati 11, O.

GORGEOUS Orchid Diamond plus Enormous 5-colored Flag. Will Rogers airmail. First American commemorative. Midget, Corsica and 25 others all 3c to approval buyers. Belmont Stampco. Washington 15, D. C.

DEALERS Wholesale catalog. Postage 3c. Franksco, 5031 Queensbury, Baltimore, Maryland.

SOMETHING New—Something Different —something terrific. Try our books of 1,000 different and see for yourself. Mostly 1c and 2c but Scott's catalog number and price under each stamp. Big discounts. Modern Stamp Co., Dept. B-5, Ferrysburg, Michigan.

FREE!—Big United States Catalog. Valuable guide and check list. Hundreds of illustrations. Approvals. Harrisco, 469 Transit Bldg., Boston 17, Mass.

10 HITLER stamps, sample stamp newspaper, special lists, all 10c. Approvals. Littleton Stamp Co., Littleton B2, N. H.

FREE. Scott's International Album. Other premiums. Particulars with approvals. Raymax, 35-X Maiden Lane, N. Y. 38.

U.S. Commemoratives 1951-1953 (32) 25c; approvals? Al Penniston, Norborne, Mo.

FREE—105 different British Colonies—Aden to Zanzibar! High Catalog; pictorials. Approvals. Send 10c for mailing. Kenmore, Milford 9T, N. H.

FREE with approvals—Israeli, British, French, Colonial, Latin American, U.S. Packet. Hobbies, 1463 Drexel, Miami Beach, Florida.

FREE 119 Foreign Stamps including Africa, Australia, Pakistan, China, India, Russia and Scandinavia. Send 10c for postage and handling. With approvals. Niagara Stamp Co., Niagara-on-the-Lake 82, Canada.

CANADA 10 different stamps free with our special low priced approvals. Herbon Stamps, 17137-C Barlow, Detroit 5, Mich.

GIANT Packet 325 different stamps. Includes scarce Nepal, Madagascar, head hunter, Luxembourg Patton graveyard, Cuba Poinsetta's, Pope on Giant Bi-Color triangles, plus other big triangles, set of San Marino Coat of Arms, Spain mint Republic issue, big Belgium UPU Philippines "Panapex" and "Fair" issues, Tunisia Carthage Museum. Many other queer issues. Entire collection only 50c with attractive foreign or U.S. approvals. Clark Stamp Co., Dept. B-41, Muskegon Heights, Michigan.

FREE Spanish colonies set mint complete with pictorial sets on approval. Oak Stamps, 1007-C Cedarhill, Royaloak, Michigan.

50 DIFFERENT U.S. 5c with bargain approvals, lists. Bookman, Manatee 2, Fla.

GENERAL World Wide (old school way) dealing of stamps. For satisfaction write: Sophus Jenssen, Coupeville, Washington.

10 DIAMOND Shaped stamps, 5c to new approval applicants. Moumblow, Box 278D, East Northport, New York.

SPAIN Red Cross set free with beautiful sets on approval. Melrose Stamps, 24303-C Melrose, East Detroit, Michigan.

FIRST U. N. Set. Among World's Prettiest. Only 10c. Approvals. Welles, Box 1246-V, New York City 8.

OLD scarce U. S. seconds on approval. Slightly defective, bargain prices. Hearnfeld, Clintonhill Station, Newark 8, N. J.

UNITED States—58 different including 8 airmails, 15 commemoratives, 10c. Approvals. Sunsets, Box 47, South Gate, Calif.

50 DIFFERENT Bulgaria 10c! Approvals. Ensign Stamp Company, Dept. S, Berdan Avenue, Paterson 2, New Jersey.

EARLY U.S.! #26 issued 1857 plus 20 other nineteenth century 25c to approval applicants. AAA Stamp Company, Arcade Building, St. Louis 1, Missouri.

ANIMALS, Birds, Triangles, Flowers, Butterflies, Fish, Ships, Locomotives, Kings, Dictators, Multicolored, Historical, Geographical, Musical, Battles, Giants, Midgets and over 100 others—only 25c with Approvals. Adults please. Canada Stamp Co., 1907 Main St., Dept. 319, Niagara Falls, New York.

ISRAEL, 25 different for only 25c. Approvals accompany. Dresel, Box 270-K, New York 25, New York.

250 FOREIGN stamps, 25c to approval applicants. Faith, 1339½ Westminster, Alhambra, Calif.

ARMENIA Pictorials, Value 65c, Free with Approvals. Exotic, Box 755, Miami Beach 39, Fla.

100 DIFF. Latin-America 25c. Exceptional Bonus Offer. Mammoth Packet List Free. Econopackets, Box 168-PS, Riverside 22, Calif.

QUALITY grabag 25c. 100 Different finest pictorials $1.00. Stark's, Novelty, Mo.

$12.00 CATALOG Value $2.25. Satisfaction or Prompt Refund. Stratton, Box 721, Armdale, Nova Scotia.

50 DIFFERENT Argentine, 10c. Approvals. Reuter, 611-D W. 40th Pl., Los Angeles 37.

FREE 105 different stamps to approval applicants. Supreme Stamp Service, 2205 So. Grand Avenue, Los Angeles 7, Calif.

SENSATIONAL, United States, United Nations, Confederate States catalogue free. Stone's, 45-S Bromfield, Boston 8, Mass.

100 DIFFERENT Stamps and illustrated Price Lists 10c. Approvals. Dahlquist Stamp Co., Omak, Washington.

BEAUTIFUL "Lady Godiva" stamp 25c. Approvals. Royal Stamp Company, Tamaqua 2, Penna.

FINE Introductory Packet 10c with Approvals. Klein, 1715 Caton, Brooklyn, N.Y.

SUPER Bargain assortments: Triangles: Brunei pictorials; Nicaragua (sports): Macau: Falklands: Niue: Fiji: St. Thomas: Seychelles. All for 10c. With Approvals. Complete U.S. stock; mint; cancelled. Alan Stamp Co., Box 57 G.P.O., New York 1, N. Y.

100 DIFFERENT US Commemoratives for $1.00. 150 Different US Commemoratives for $2.00. 200 Different US Commemoratives for $4.00. Price lists of USA and foreign stamps and coins free. No approvals sent with above. Bryson Stamp Co., 612 White, Toledo, Ohio.

UNITED Nations cover free to applicants of U.S. or British Colonial approvals. Alan A. Taylor, Skyland, N. C.

30 COMPLETE sets, $1.00. Approvals. Pinkerton, Box 81-M, Bethlehem, Penna.

FREE Sample—Interesting, informative. Illustrated! National Stamp News, Anderson, South Carolina.

COLORFUL Italy pictorial set Free to approval applicants sending postage. Comanche, Box 7817, Lakewood, Colorado.

FREE U.S. illustrated bargain catalogue. Rothberg, 44 Bromfield, Boston 8-P, Mass.

BARGAINS galore, low priced approvals. Chur, Box 117, Williamsville 21, N.Y.

NEW Zealand triangles, Queen Elizabeth, 10c with approvals. Seminole Stamps, Box 1138-S, Coral Gables 34, Fla.

UNITED States approvals. Select copies used, mint. Kingsbury, So. Woodbury 2, Vt.

UNITED States—40 different 10c; 40 different Commemoratives 25c. No approvals. Seidenberg, Appleton 944, Wisconsin.

WONDERFUL Offer Seven complete mint sets only 10c with approvals. Reich (S26), 1033 Lawrence, Chicago 40.

BEAUTIFUL New Zealand 1943 Elizabeth and Margaret Rose triangles only 10c to approval applicants. George Richie, 1539 Sixth, Alameda, Calif.

FREE Congo Flower Set. Approvals. Eagleco, 6916 Roosevelt Boulevard, Philadelphia 49, Penna.

44 PICTORIALS—Triangles, bi-colors etc., only 25c! Approvals. Cole, 43-G Rinewalt, Buffalo 21, New York.

100 DIFFERENT Spain 25c. Penny approvals included. Reed, Box 980, Chicago 90, Illinois.

LION triangle 28, others 3c. K&S, 303 Clinton Ave., Newark, New Jersey.

100 DIFFERENT, catalog over $10.00 for 50c with approvals. Ayot, 6 Boulton Drive, Toronto, Canada.

25 PORTUGAL, mystery gift—10c. Smithco, Box 6618, Kansas City 23, Mo.

EXCHANGE your duplicate stamps! Send 100 different and dime for 100 different foreign. Koosel, 196 Secord, Port Arthur, Ontario, Canada.

1c—2c—3c APPROVALS. Raines, 7216 Irvine Street, North Hollywood, Calif.

100 DIFFERENT British Colonies—10c. Approvals. Boulder Stampco, Box 578-S, La Mesa, California.

250 STAMP hinges and 25 different Australia 3c with approvals. Jaydee, 218 Dickinson S.W., Grand Rapids 7, Michigan.

50 DIFFERENT U.S. Commemoratives 25c. Durham, 1021 N. Granger St., Saginaw, Mich.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The August issue closes on June 25. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 554, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

29 ANTIQUES, RELICS & INDIAN GOODS

INDIAN Beadwork, leathers, beads, feathers moccasins, wigs, supplies; buying direct from Indians, prices reasonable. Free list. Pawnee Bill's Indian Trading Post, Box 35-PS, Pawnee, Oklahoma.

4 FINE Indian Arrowheads $1.00, notched flint tomahawk $1.00. List free. Lear's, Glenwood, Arkansas.

30 MINERALS & PRECIOUS STONES

ATOMIC Trinitite! Send 25c for actual radioactive atomic blast specimen and information on prospecting for tungsten, uranium, mercury with ultra-violet Mineralite. Dept. PS4, Ultra-Violet Products, Inc., South Pasadena, California.

GEMSTONES. Mineral specimens. Geiger Counter, uranium samples. Every variety. Lowest prices. Free booklet. Plummer's, 4720 Point Loma Avenue, San Diego 7, Calif.

35 ROCKS, minerals, mounted, identified, described $2.50. Bar Triple G Ranch, Box 7304, Tucson, Arizona.

ONE carat genuine rough diamond $20.00. Sample diamond $2.00. House of Diamonds, Box 1119-E1 Grand Central Station, New York 17.

GEMCUTTING. Silvercraft authority. Illustrated magazine tells how. Cut rocks, make jewelry. 150 ads illustrating equipment, offering gems for collectors, cutters. Postal brings literature. Lapidary Journal, Drawer D, Palm Desert, Calif.

Copyrighted material

SAPPHIRE—tourmaline—topaz—garnet—peridot. 5 uncut gem specimens. $1.00. O'Briens. 1116B Wilcox. Hollywood 38, Cal.

31 HOBBIES, COLLECTIONS

INVENTING can be an interesting and profitable hobby. Write for complete particulars. Institute of American Inventors, Dept. 30-E. 631-E St., N. W., Washington 6, D. C.

WANTED — Cigarette, tobacco cards. Write Charles Bray, East Bangor, Penna.

UNUSED matchbook covers—100 different $1.00—36 page catalog 25c—matchcover album $3.00. Charles Edelman, 1311P East 84, Cleveland 3, Ohio.

MILITARY Miniatures: U.S. Marines, American Revolution, Civil War, Custer's Cavalry. Illustrated Catalog 25c. Bussler Miniatures, Dept. E. 59 Russell Park, Quincy 69, Mass.

32 PHOTO FINISHING, PHOTOCOPIES, ETC.

35MM—36 Exp. Develop & Jumbo Print each $1; Guaranteed Quality—Free Mailer. Flash Photo, Box 36P, Parksville Sta., Brooklyn 4, N. Y.

TWO Prints each good negative, 8 exposures, 35c; 12 exposures, 50c; reprints, 4c. Mayfair Photo Service, Box 617-A, Toledo 1, Ohio.

8 EXPOSURE rolls enlarged 50c, Fastest, Finest Service, Camera, Dept. A. Box 280, West Chester, Penna.

NOW—24 hour service. 8 exposure roll, one each 30c; two each 40c. Add 10c for 12 and 16 exposures. 20 billfold prints on double-weight paper from print or negative $1.00 L. A. Eastman Studio, Bode, Ia.

DISGUSTED with poor photo finishing? Something new. Send film or inquire. Your credit is good. Statement with finishing. Jerry's, Dept. D, Box 1231, Lansing, Michigan.

ROLL developed and 4x6 or 3¼x4½ oversize glossy velox prints 8 exposures 40c. 12 exposure 60c, 16 exposure 80c. Hagner Photo Service, 1318 West Columbia Avenue, Philadelphia 22, Pa.

SENSATIONALLY New—16 oversize contact prints or 8 plastic bound superpak album jumbo prints with your first roll 25c. Album Studios, Weatherford, Okla.

FREE Mailers, 8 contacts 30c, jumbos—40c. 12—45c. Jumbos—55c, reprints—4c. Jumbos 5c. Western Photo PS64, Box 298, San Francisco 1, Calif.

8 JUMBO Prints in Album 30c. 12 exp. 45c, 20 exp. 85c.; 36 exp. $1.25; Free Mailer. Mel's Photo, Box 106D, Brooklyn 20, New York.

ROLLS reprints jumbos in albums 8—30c, 12—40c, 16—50c. Bobs Photo, Box 23, Fairmont, West Virginia.

TWO-Bits (25c) 8-exposure roll developed, Jumbo prints. Electronically processed, satisfaction guaranteed. 12 exposure 35c; 16 exposure 50c. 35mm finegrain 20 exposure 90c. 36 exp. $1.25 Dated Borders. Reprints, Jumbo, 4c. (minimum 5). Cash only. No stamps. Fast service. Alamo Photo Co., Dept. B, San Antonio 6, Texas.

OVERSIZE Prints no extra charge. 8-exposure roll, 30c. 12-exposure, 45c. 16-exposure, 55c. Reprints oversize 4c. Finest quality. Mail Order Photo Service, Box 297, Watertown, Wisconsin.

JUMBO album prints eight exposure roll 40c twelve 50c. free mailers. Electronic Photos, Calistoga, Calif.

33 MOTION PICTURES, SLIDES, SOUND EQUIPMENT

GUARANTEED Fresh 8mm roll, magazine; 16 mm roll, magazine movie film. Color, b&w. Free catalog. Eso-H. 47th Holly, Kansas City 2, Missouri.

8-16MM. Silent-sound films. Complete rental library. All latest subjects. Free catalogue (sample film 10c). Garden Film, 317 West 50th. New York 19.

CLEARANCE Sale of 16mm. sound films. Want a real buy in 16mm. sound films? Take advantage of the I.C.S. 1954 clearance sale of 16mm. sound features, comedies, cartoons, educational films, religious subjects—New, used. Send for our giant list "A" today stating machine you own (make and model). Institutional Cinema Service, Inc., 1560-PS Broadway, New York 36, N. Y.

FREE Giant catalog of 8mm & 16mm films for home movie enthusiasts. Films for every occasion. Lee Stann, Dept. PS6, 11 Willard Ave., Mt. Vernon, New York.

MOVIE Camera Film: 8 mm roll $1.50, 16mm 100' $3.00. Free processing. Better Films. 742 New Lots, Brooklyn, N. Y.

TAPE Recorders, Tapes, Accessories. Unusual Values. Dressner, 624 East 20th Street, New York City 9.

8MM & 16MM Professional National Parks Movies in Kodachrome list 10c. Ideal Service Supply, Suite 506, 20 West Jackson Blvd., Chicago 4, Illinois.

16MM. Sound Projectors, film, rental, sale. Free catalogs. National Cinema, 71 Dey Street, New York City.

5,000 8-16MM. Silent-Sound Films. International, 2120 Strauss, Brooklyn 12.

DIME brings 32-page catalog bargains in new, used 16mm., 8mm., films, used 16mm. sound projectors, new 2"x2" color slides. Blackhawk Films, 1143 Eastin, Davenport, Iowa.

34 CAMERAS, PHOTO SUPPLIES

PHOTOGRAPHY For Pleasure or profit. Learn at home. Practical basic training. Long established school. Free booklet. American School of Photography, 835 Diversey Parkway, Dept. 1722, Chicago 14, Ill.

KINE Exakta VX, f2.8 CZT preset, case, Spotless, $225.30. All accessories. Free bargain catalogue. Dealer's Mart, 54 Beverly Rd., New Rochelle, N. Y.

BASS Says: Quality Cameras Since 1910. When in Chicago visit the Camera Cross Roads of the World . . . or write us for your favorite equipment, new or used Satisfaction Guaranteed. Bass Camera Co., Dept. AG, 179 W. Madison Street, Chicago 2, Illinois.

DISCOUNTS to 40%—cameras, projectors, tape recorders, lenses. Write for individual quotations, no catalogs. Classified Camera E. 253 E. 94th Street, Brooklyn, New York.

AMAZING Camera Bargains. Send for our free Photohelper price list. Morgan Camera Shop, 6262-B Sunset Blvd., Hollywood 28, Calif.

FREE Photographic Bargain Book packed with hundreds of fine values in still and movie cameras, lenses and latest accessories, both in new and used. Write now for your free copy to Central Camera Co., Dept. 11F, 230 S. Wabash Ave., Chicago 4 Ill. (Photographic Headquarters Since 1899).

REDUCED—excise tax—new Argus C-3 outfit $49.50 other terrific savings. Free catalog. Camera Shoppe, Box 601-S6, Mount Vernon, New York.

20 TO 40% discount everything photographic. Dart, 3812F Atlantic Avenue, Brooklyn 24 New York.

TAKE Better Pictures! 256-page "Everybody's Photography Manual" shows you how to take better pictures. Over 750 illustrations; new facts on films, cameras, developing, home movies, accessories, more! Only $2.49, satisfaction guaranteed. Send to Popular Science, Dept. 654C, 353 Fourth Avenue, New York 10, New York.

BUY wholesale nationally advertised cameras, photo supplies, thousands other products at big discount. Free "Wholesale Plan." American Buyers', 629-SS, Linden, Buffalo 16, N. Y.

STEREO-Realist, f3.5 ctd, original carton, $121.38. All accessories. Free 1001 bargain catalogue. Dealer's Mart, 54 Beverly Rd., New Rochelle, N. Y.

35 MUSIC, SONG WRITERS & RECORDS

WANTED! Poems for musical settings. Write Songwriters' Service, Clifton, N. J.

POEMS Wanted for musical setting. Send poems. Free Examination. Five Star Music Masters, 646 Beacon Bldg., Boston, Massachusetts.

SONGWRITERS! Outstanding offer. Ray Hibbeler, C-15, 6808 Oleander, Chicago 31, Illinois.

SONGPOEMS Wanted. Mail to: Tin Pan Alley, Inc., 1650 Broadway, New York 19, N.Y.

SONGWRITERS! Protect your poems and songs! Don't mail anywhere! Write for safe procedure! Song Service, 333 W. 56th, Dept. P.S., New York 19, N.Y.

FREE Record of your song—Your words—My melody. Free information. Johnny Mack's Melody Mart, 1094 West 39th Street, Dept. K. Los Angeles 37.

POEMS Wanted for musical setting. Send poems. Free examination. Crown Music Company, 1472-P Broadway, New York City 36.

POEMS Wanted to be set to music. Free examinations. Send poems. McNeil, Master of Music, 510-PS, S. Alexandria, Los Angeles, California.

SONGWRITERS! Send poems, songs. Music Service, 243 West 72nd St., PS, New York 23.

WANTED! Poems for musical settings. Write Songwriting Service, 2959 Division, Chicago 22.

SONG Writers write your own melodies for your poems. Solv-A-Tune shows you how. Dept. 9, Box 556, Washington 4, D.C. $2.00 or C.O.D.

SONGWRITERS! Send lyrics, poems. Free examination. Popular Music Service, 175 Tremont Street, Boston 11, Mass.

1954 ACCORDIONS — Wholesale. Free catalog. American Accordion Center, PS-6, 5329 Belmont, Chicago.

SONGWRITERS—Free Melodies! Free Lyrics! Kermit's Song Service, 1206-P Monsey, Scranton 9, Pa.

POPULAR Songs. How to write and sell them. Write for free booklet Successful Songwriting. Gateway Songs, Box 2470, Hollywood 28, California.

36 RADIO, TELEVISION, SUPPLIES & EQUIPMENT

NEW TV Catalog Free. Loaded with bargains for TV servicemen, technicians, installers. Finest new TV antennas, Motorless Directronics, Multi-Channel Yagis, UHF Antennas, Converters, Motors, Boosters, Parts, Instruments, hundreds of quality accessories at money-saving prices. Get your catalog now! National Electronics, 4006 Delco Bldg., Cleveland 3, O.

FELLOWS—build a subminiature battery radio, plans $1.00. Box 247M, Pasadena, California.

BUILD 15 Radios At Home only $19.95 complete. Learn Radio Construction, Theory, Trouble-Shooting, Code, F.C.C. Regulations. Complete Radio Course includes all parts, components, Instruction Books, etc. Free Radio Tester and Soldering Iron, you keep everything. No experience required. Money-Back Guarantee. Order direct or send for descriptive literature. Valuable Radio and TV Guide upon request, free of charge, no obligation. Progressive "Edu-Kits" Inc., 497 Union Ave., Dept. PS-18, Brooklyn 11, New York.

MINIATURE "Silver Dollar" TV antenna. Improved Reception Guaranteed. Send $2.49 cash or money order. Built It, Box 8023, Northgate, Seattle, Washington.

CRYSTAL radio kit with phone $3.00 postpaid. Cox, 515 Zeisler, Kankakee, Ill.

CRYSTAL Radio experimenters. Write Leslie Hulet, R. 4, Lakewood, New Jersey.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

MAKE Simple, Tubeless, Batteryless, Distance-Getting radio. Genuine Melomite crystal, Detector, Illustrated instructions. 50c postpaid. Allen, 427-PS5, Clinton, Mo.

REPAIR radios, televisions. Interesting details free. C.H.H., Technician, 4167 Hemphill, Fort Worth, Texas.

BETTER TV Reception with our metalic tape indoor antenna kit. Your Choice of Channels 2 thru 13. Postpaid $1.25. Riverway Industries, 1135—8th Avenue, Longview, Washington.

FREE List. Pictorial Construction Projects. "Builder's Handbook", 25c. Alena, Box 24, Astoria 6, New York.

DIAGRAMS for repairing Radios $1.00, Television $2.00. Give make and model. Diagram Service, 672-PS, Hartford, Conn.

BRAND new television boosters nationally advertised at $29.95 now only $15.00. Model AB manually tuned. Model BB-2 requires no tuning. Send check or M.O. to Lorne Hopwood, 1102 East 17th, National City, California.

INCREDIBLE! One tube radio receives television, FM, CAP and amateur broadcasts. Very easy and inexpensive to build. Diagram with special tube only $2.00. Springfield Enterprises, Box 54-A6, Springfield Gardens 13, New York.

MAKE simple powerful distance-getting crystal radio. Works anywhere. Illustrated booklet fifteen cents. Money back guarantee. Francis, Box 5963, Cleveland, Ohio.

SIMPLE television, radio trouble analyzer $1.00, postpaid. Stegotronics, Colchester, Conn.

F.C.C. Commercial operator license quickly. Grantham, Dept.5, 6064 Hollywood Blvd., Hollywood 28, California.

CLEARCO Crystal radio kit $1.50; preassembled $1.75. Free catalogue. Clearco Crystal Co., Box 1857, Milwaukee, Wis.

CRYSTAL Radio—60c. Guaranteed Reception. Cozzo, 1080—68th Street, Brooklyn 19, New York.

REPAIR your own TV! Instructions compiled exclusively for your set. Simple as replacing light bulbs. See our ad page 56. Send set name, model, number, $1.00. LS Engineering, Box 4113, Dept. C, North Hollywood, Calif.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The August issue closes on June 25. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 554, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

37 BUSINESS OPPORTUNITIES

GOOD Paying Business Silvering mirrors, plating autoparts, reflectors, bicycles, bathroom fixtures, etc., by late methods. No tanks or shop required, outfit furnished. Free Booklet. Gunmetal Co., Ave. E. Decatur, Illinois.

FORTUNES made raising crickets and fishworms sell by mail—complete instructions—$1.00. Large breeder redworms $4.50 per 1000. Postpaid. Carter Worm Company, Plains, Georgia.

OPERATE profitable mail order business. Write Walter Service, 4159-B East 112th, Cleveland 5, Ohio.

MAKE money addressing envelopes. Our instructions reveal how. Glen Glenway, 5713 Euclid, Cleveland 3, Ohio.

LIVING miniature ("Ming") trees only 10 to 20 inches tall. Grow at Home. Big Profits! Spare time opportunity. Fascinating! Amazing! Write for Free Seed and Plan. National Nursery, Dept. CG, Inglewood 4, California.

NEWEST Spare, Full-Time Business. $5 to $10 hour possible. Paint with Suede—the finish with touch And eye-appeal. Beautify auto dashboards, signs, radios, toys, figurines, lamps—100, 1 others. Complete, Step-By-Step Instructions sent for no-risk examination. Free details. Coast 1004-MF, So. Los Angeles St., Los Angeles 15.

IMPORT-Export! Opportunity, profitable, world-wide, mail-order business from home, without capital; or travel abroad. Established World Trader ships instructions for no-risk examination. Experience unnecessary. Free details. Mellinger, A696, Los Angeles 24.

MAKE Money spare or full time, casting Metal Toys and Novelties. Big wholesale and chain store demand for Autos, Soldiers, Ashtrays, Banks, etc., keeps manufacturers busy. Production moulds furnished for up to 100 and more castings per hour. No experience or special place necessary. Write for information and illustrations of patterns needed. Metal Cast Products Co., Dept. E, 1696 Boston Road, New York 60, N. Y.

VENDING Machines—No selling. Operate a route of coin machines and earn amazing profits. 32-page Catalog Free! Parkway Machine Corporation, Dept. 73, 715 Ensor St., Baltimore 2, Maryland.

RECAST old batteries into new. Latest achievements. Battery Laboratories, Minneapolis.

ENVELOPES addressed accurately, reasonably. Fast Service. We have capable addressers in your city. Glenway System, 5713-X Euclid, Cleveland 3, Ohio.

BREED Rare Tropical Fish at home. Earn Big Money! Learn Secrets! Help fill huge demand. Amazing Opportunity! Free Plan. Tropicals, 1008-G Los Angeles St., Los Angeles 15.

FIX typewriters. Free booklet describes our modern, inexpensive home-study course. Factory methods taught. Write Typewriter, Building 4, Tarentum, Penna.

$25 WEEKLY working two hours daily at home. Lycke, Box 2471-B, Cleveland 12, Ohio.

BRONZED baby shoe metallizing equipment. New and used. Big selection of metal and onyx mountings. Free catalogue. Hollywood Bronze Supply, 1624-A E. First Street, Los Angeles 33, California.

WE Love our mailman—He leaves over $1,000.00 monthly in our rural mailbox. My college professor husband drafted a scientific home mailorder method. We bought a Texas ranch, live as we always wanted. Now we sell the "Ranch Mailorder Method." Operates anywhere. Inquire: Eveningshade Ranch, Helotes, Texas.

"INCOME" from local information. No Selling. Write Neherco, LaVerne 6, Calif.

$500,000 BY mail from home. Free Folder. Publicity, Kalamazoo 65EU, Mich.

AMIDON fittings add to incomes. Amidon Engineering Co., Elyria, Ohio.

WOMEN! Make Big Money at home. Sew ties for us. It's fun. Earn $10 day easy. No selling, no experience, no machine necessary. We supply everything. Help us fill huge demand. Exciting details free. Fashion Ties, 2521-X Manchester, Inglewood 4, California.

FREE! "301 Profitable Small Businesses!" Amazing shoestring plans! Work Home! Start Sparetime! Deumant Surveys, Kenmore 28-T, New York.

BOOKKEEPERS, increase earnings operating sensational bookkeeping service. Kern, 4942-B Vineland, No. Hollywood, Calif.

HAVE New York address with mail service $2 month. 516 Fifth Avenue, Suite 1004, New York.

OWN Your Own Sewing Machine Business. For dealers' illustrated catalog with confidential price lists, send 25c to cover handling and postage. Home Machine Supply, 750 Sixth Ave., New York.

MAKE Money At Home as renewal headquarters for all magazines. Liberal commissions. No experience—No capital needed. Supplies furnished. Write for Free Catalog. McGregor Magazine Agency, Dept. 510B, Mount Morris, Illinois.

ADVERTISING book matches—Cash in on big demand—sell Union Label matches. Cuts for all businesses and political parties—Free powerhouse selling kit—low prices—protection guaranteed on repeat orders—Cash commissions. Superior Match Co., Dept. PX-654, 7530 Greenwood, Chicago.

POPCORN and Potato Chip Equipment. LECo, Box 933-B, Springfield, Ohio.

MAILORDER Home business using Free Advertising Method. Information free. H. G. Seidel, 7070 Hollywood Blvd., Hollywood 28, California.

SIX Magic words for financial success. This will make you think. 25c. Jennings Company, 118-H Naples, San Francisco 12.

PRINT for Profit at home. Amazing new method prints colorful posters, banners, greeting cards, glassware—anything. Hundreds at time. No press needed. No art. Fantastic profits! Need representative your area immediately! Free home-business plan. Screen-Print, Los Angeles 15, California.

NATIONALLY advertised appliances, cookware, diamonds, watches, typewriters, etc. Wholesale catalog 50c.—J. J. Davis Co., 30 E. Englewood Avenue, Englewood, New Jersey.

TO $40.00 weekly. Sparetime, home operated mailorder business. Successful "Beginner's" plan. Everything supplied. Lynn, 10420-C National, Los Angeles 34, Calif.

MONEY, Typing—Sewing! Details free. Edwards, 3915-PS, 12th, Des Moines 13, Iowa.

BUILD luggage and cases at home. We sell your products. No special equipment needed. Free details. Casecraft, 805-X11 Sunset Blvd., Los Angeles 12.

LEARN Sewing Machine Repair, electrify, trade, sell. How to make Big Money at home sparetime. New zigzag machines, parts, etc. wholesale. Free details. Taylor Service, Hamilton PS-6, Ohio.

$1,000 MONTHLY possible from your own easily learned office business. Write Cole Associates, Syracuse 2, N. Y.

ADDRESS Advertising Postcards. Must have good handwriting. Box Nine, Watertown, Mass.

CASH in big on the "Do It Yourself" boom! Crushed redwood cedar! Cedarizes closets, chests, drawers. Applied like paint. Tremendous profit potential to hardware, paint builders dealers contractors. Attractive bags, low cost. Exclusive franchised territories. Write for details. Plant, 90-L Summit Ave., Brookline, Mass.

NOTARY Public appointments. Our 25th year. Inquire: Stationers, Helotes, Texas.

PROVEN best stucco paint, etc. big money maker, full information write, A. E. Larson, 3419-9 East, Salt Lake City, Utah.

MINIATURE Trees—Why pay $2.00—$10.00 for growing secrets? Free Details. Tiny Trees, 5038 N. Winthrop, Chicago 40.

PLANNING to start a new business or need capital to expand? I can help you. F. S. Winslow, 4980 Marine Drive, Suite 635, Chicago.

THRILLING Profitable Home Business. Make fast-seller chenille monkey trees, dolls, flowers. Terrific holiday demand. Information free. Velva, Bohemia 17, N. Y.

MINK Raising information free. Complete. Lake Superior Mink Farm, Superior E E5, Wisconsin.

HOW and where to obtain Capital? Free details. Star Service, Wapakoneta, Ohio.

OPERATE "Escalator" Mailorder system, selling our products or any products. Fastest, most revolutionary mailorder system known. Write: Selbyco, Decatur 169, Ill.

LIQUID Rubber make flexible molds. Free Sample. Chaney, 1130 E. 16th St., Jacksonville 6, Fla.

EARN $15,000-$30,000 Annually. Franchise protected. Guaranteed minimum $12,500 or money back. Live at home. No merchandise to buy. Self-employed. One of the most exclusive and noncompetitive businesses in United States and Canada. Send for free explanatory booklet. Harrell & Company, Box A-2, Louisville, Illinois.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

REPAIR dolls; learn reweaving; make rubber stamps Catalog of "60 Ideas" Free. Universal, Box 1076-B. Peoria, Ill.

START Venetian Blind Laundry. Profitable lifetime business. New machine. Free booklet. F.D. Co., 442 N. Seneca, Wichita 12, Kansas.

NATURAL molding rubber, extra thick. Free sample. Flock, tinsel candle wax. W. Wooley 115-B Donald, Peoria, Illinois.

HOW To Build Your Own Mailorder Business. Copyrighted. 25c. Ballard Service, 425 East Saint Catherine, Louisville 3, Kentucky.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay $3.50 lb. We paid Babbitt $4,165.00 in few weeks. Free Book. Washington Mushroom Ind., Dept. 178, 2954 Admiral Way, Seattle, Washington.

MONEY in new greaseless doughnuts. Start in kitchen. No smoke. Sell stores. Free recipes. S. Ray Co., 3605 South 15 Ave., Minneapolis 7, Minn.

BECOME Fully Qualified Ordained Minister! Our Ministers Heal, Marry, etc. Send dime for details. Non-sectarian. Order of The Holy Grail, Box 3532, Philadelphia 22, Penna.

WHOLESALE Catalog! Rock bottom prices! Nationally advertised appliances, watches, typewriters, cameras, tools, toys, housewares, phonographs. Consolidated Distributors, Box 1537B, Paterson, New Jersey.

EARN Hundreds Of Dollars, at home sparetime. Rush $1.00 now for complete guaranteed plan. How Publications, Wetmore (A), Texas.

LIQUID Marble—Colorful glossy! Molded, brushed, sprayed! Cast Novelties, Statuary, Colored Tiles, Flexible Molds, Composition Floors. Particulars free. Marbleizing Service, Edwardsville, Illinois.

BUY Wholesale Thousands Nationally advertised products. Exclusive large catalog $1.00. Hamilton Sales Company, York, Nebraska.

START venetian blind laundry-machine patented. Inventor, world's largest manufacturer explains how. Free booklet. LC Company, 522 North Rural, Indianapolis 1, Indiana.

BECOME A Game Warden, or join Forestry, Park, Lookout, Wildlife Conservation services. Enjoy outdoor work, good pay, real security. Complete information Free! Write "Home-Study Institute," 3156JE West Eighth, Los Angeles 5, Calif.

MAKE $10,000 To $20,000 A Year at home in spare or full time. Tested plans and copyrighted instructions $3.00. G. Bowman, 7119-O Clyde Avenue, Chicago 49, Illinois.

MAKE Perfumes Other Profitable Products. "Carelabs", 1914 Chouteau-PS6, St. Louis 3, Missouri.

TIN-Cans. Turn them into cash. Nine methods. Instructions 50c. Charles Company, 12-ECD, Norwood, Ohio.

RAISE Earthworms!! Bait! Soil! Easy! Profitable! First get True story, "An Earthworm Turned His Life". Send dime. Earthmaster System, 14D, El Monte, Calif.

GET $10 Orders by Mail: 100% Profit! Terel, Bogard, Missouri.

WHY shouldn't you make big earnings? You can taking snapshots. Free details. Warco's, 2689W Coolidge, Oakland 1, Calif.

ALL jigsaw owners—new toy makes possible $60 from ten foot 2x4 example $2.00. S. A. Allred, 1610 E. Broadway, Ft. Worth, Texas.

FREE Folio describing "$45,000; Unlimited Vacations Plan." No canvassing, mailorder, merchandise, equipment. Unknown. Works itself—home! Keep job. Haylings-PS, Carlsbad, Calif.

BUY Wholesale 450,000 Products. Literature Free. Carter, Box 6011-A, Chicago 80.

MAKE flexible molds. Cast plaques, figurines. Free sample. Tooker, 630-A Chestnut, Hamilton, Ohio.

SELL Books, Merchandise By Mail. Good Profits. We furnish circulars, names —ship your orders. National, Box 88, Dorchester, 22H, Mass.

LEARN Correspondence School Operation and Management then put your own ideas across. Many opportunities. For Free lesson write Director, P.O. Box 46-904, Los Angeles.

START your own mail business at home in your sparetime with small investment. Proven merchandising methods, no crackpot schemes. Write, Craig, Southern Pines 2, North Carolina.

$$$$ IN personalized baby record books. Sell by mail. Eleven thousand new prospects daily. Use same literature we do. No-Co-Ro, Oakland 6-P, California.

FREE Booklet! "Mail Order Confidential." Elson, Box 1631-C, Fargo, No. Dak.

$1.00 MAILORDER Item. Light Mailer. Prospects, Every Home. Circulars Furnished Free. Gordon Products, Box 1022A, Syracuse 1, N.Y.

MAKE Perfumes, other products—Sell mailorder—Formula Catalogue Free. "International", 6347 Parnell-PS-6, Chicago 21, Illinois.

EARN extra money weekly mailing circulars for advertisers. Complete instructions —25c. Siwaslian, 4317-B Gleane, Elmhurst 73, New York.

START A Buying Service, buy wholesale thousands nationally advertised products. Make big profits selling at sizeable discounts. Postcard brings details. American Buyers', 627-S Linden, Buffalo, N. Y.

WANTED! Home Producers, by manufacturers in our Clearing House Service. Become subcontractor, casting plastic products for these companies. Thousands of easy-to-make items required for consumer-industrial use. Cash in at home, without previous experience. Plastic Service Associates, Dept. 6-PS East Boston 28, Mass.

SELL To Women By Mail From Your Home—Repeat Order Merchandise. Everything Furnished. Big Profits. Mohawk, 37B Second, Amsterdam, New York.

WHAT'S Your Field Of Interest? Whatever it is, specialized magazines will help you get ahead. Examine current copies of those covering your field through our Easy-to-Get-Acquainted service. Choose from 4,387 covering all fields—business, trades, agricultural, professions, insurance, real estate, music, educational, hobbies, sports, etc. Current List Free. Commercial Engraving Publishing Company, 34S North Ritter, Indianapolis 19, Ind.

$15 AN hour! Become Tax Expert. We train you. Urgently needed. Year 'round. Free details. Union Institute, Lakewood 1-K, New Jersey.

ESTABLISH Profitable Automatic Shoe Shine Route. Proven. Write Jiffy Shine, 1630 South Second Street, Phila. 48, Pa.

BUY Wholesale—sell retail Brand Name appliances, watches, etc., Full details—Catalogue 50c. International Sales Co., 175-B Fifth Avenue, New York 10, N. Y.

$250 WEEK reported! Free book "505 Odd, Successful Businesses." Work home! Expect something Odd! Pacific-36C, Oceanside, California.

NEW Exceptionally profitable plans, ideas for home operated mail business. Rush name. Miller, 1772-R Carlyon Road, East Cleveland 12, Ohio.

ELECTROPLATE autoparts, novelties, mirrors, baby shoes. Easy, inexpensive home processes. Free booklet. Tyco Metals, Box 13231-CQ, Houston 19, Texas.

PLASTERCRAFT molds, liquid rubber, plasters, flocks, candle supplies. Catalog and manual free. Jayhawk Plasters, Blue Rapids, Kansas.

HAVE Home Mail Business—Get $10 Orders In Every Mail—Keep $8.00. Everything Furnished. Hutchinson 401C Adams, Dorchester 22, Mass.

MAKE Money Addressing Envelopes. Our instructions state how. Merit Company, PS-983—E. Main, Columbus 5, Ohio.

EARN $2.00 Hour! I do—making Sandals. Youngs, 1308-PS South First, Arcadia, California.

$26,500 SALES in two weeks! Amazing radio-mail order method. Free details. Broadcast Service 1412-X Great Northern Building, Chicago 4, Ill.

COLORGLAZED Concrete pottery made without molds. Patented method. Cemetery products, novelties, tiles, Basement leak-sealing. Money-making projects. Booklet, details free. Men only. National Potteries, Grand Rapids, "Minnesota."

CASH from trash! Many Methods. (No manufacturing.) Instructions, 25c. Newlon, 505 Cherry, Bonham, Texas.

UNUSUAL homework opportunity. Spinning angora for us. Men, women, sparetime. Angora House, PSM, Springfield, Ill.

OPERATE a small motel. Details Free. R. Bailey, Monterey, Tennessee.

$60 WEEKLY addressing postcards. Instructions 50c. Norval Roland, Langhorne, R.D. 4, Penna.

HUNDREDS of ways to make money! Send for folder "A". Hilltop Products, Room 940-P 30 West Washington Street, Chicago 2, Illinois.

MAKE Money Clipping Wanted Items from your newspaper for publishers! Some worth up to $10.00 each! Write for information. Newscraft Publishers, PS-983-E. Main, Columbus 5, Ohio.

MAKE $100.00 Weekly Mailing Merchandise Catalogs, Bearing your name. Sample catalog, details 25c. Products, 526 Western S., Chicago 12, Illinois.

BUY it wholesale. Manufacturers. Distributors. Over 850,000 items. Literature free. Olsen, 1231-B East Third St., Duluth 5, Minnesota.

START your own profitable home mailorder business! We supply everything! Write today! Studio Products, Box 564-"D," Glendale 5, California.

$46 FROM Square Foot Plywood; Jigsaw necessary. Write: Woodart, Bridgewater, Mass.

SENSATIONAL Home Plastic Business. Men and Women make Big Money . . . Spare or Full Time. (Also Valuable Liquid Marble information.) Free Catalog . . . Write: Bing Products, PS-654, Watertown 72, Mass.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The August issue closes on June 25. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 554, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

38 MONEYMAKING OPPORTUNITIES

SELL Titania gems; $9.75 carat wholesale. More brilliant than Diamonds. Free catalogue. Diamonite 1404-S Mitchell, Oakland 1, Calif.

DETECTIVES Earn Big Money. Experience unnecessary. Detective Particulars free. Wagoner, P-125 West 86th, N. Y. 24.

MAKE Money addressing Envelopes! Our information reveals how. Only 30c. Business, Dept. 45-F, P. O. Box 2224, St. Louis, Missouri.

SPARETIME Profits Taking Subscriptions. All Magazines, Wholesale Catalog Free. Cassell Agency, Westfield 1, N. J.

$500,000 BY mail from home. Free Folder. Publicity, Kalamazoo 65ET, Mich.

NATIONAL mail order house offers sensational mailing program full or part time. Suppliers Mailing, Buena Park 9, Calif.

FREE! Sensational Money Making Ideas! Boyer, 65 Uptown, Hoboken, N. J.

Copyrighted material

1930 DEPRESSION forced me to invent my own business—a minimum-cost, high-potential home mailorder. Lucky design paid immediately, over $1,000 every month since! Over half net! This original design, "Selective Mailorder," is United States Postal Service approved. Now mapped out to guide mailorder operators. Literature free. Eveningshade Ranch, Helotes 15, Texas.

FREE! "301 Profitable Small Businesses!" Amazing shoestring plans! Work Home! Start Sparetime! Deumant Surveys, Kenmore 23-T, New York.

FRENCH-Type Perfume Really Sells!! $1.00 brings $4.50 flacon, details (refundable). Elliott-Stuart, 4616-B Hollywood Blvd., Hollywood 27, Calif.

WIN contest money. General Contest Bulletin gives hundreds of tips. Lists current contests and rules. Sample 25c. General Contests, 1609-A East 5th, Duluth, Minnesota.

ADDRESS Advertising Postcards. Must have good handwriting. Box Nine, Watertown, Mass.

$50 WEEK. Address and mail postcards for us at home spare time, pen or typed. Enclose stamped self-addressed envelope. C. Wyatt, P. O. Box 2274A, Asheville, N.C.

FREE. Wholesale price information. Nationally advertised merchandise. Speedway, Box 5204, Indianapolis 1, Indiana.

NEW 7"x11" Ultra-Blue Signs, 7c, retail 50c. Sample free! Lowy, 812 Broadway, Dept. 794, New York 3.

MILLIONS In Ideas, 20c. Enterprises, P-334 S. Wabash, Rm. 1, Chicago 4, Ill.

HOMEWORK! Immediate Commissions! Permanent! Experience Unnecessary! Hirsch, 1301-B Hoe, New York City 59.

MAKE to $4.50 hour doing common pen lettering. National Artists, 801½-C North Marsalis, Dallas 3, Texas.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay $3.50 lb. We paid Babbitt $4,165.00 in few weeks. Free Book. Washington Mushroom Ind., Dept. 179, 2954 Admiral Way, Seattle, Washington.

MAKE Big profits operating mailorder business. Lewis Bartlett, Richland, Ga.

PROFITS Guaranteed for sparetime. No investment. Not Mail Order. Canvassing unnecessary. Nothing to make or learn. New plan. Free details. Transamerican, Dept. 61, Box 815, Atlanta 1, Georgia.

MANUFACTURE Rhinestone and Pearl Jewelry at home. Latest creations, tremendous profits, no skill needed. Postcard brings illustrated catalog of settings, stones, etc. A. V. Cutt Co., Inc., 210-H Fifth Ave., New York 10, New York.

"TOOFIE" The Clown Dancer, Special $1.50—Dealers wanted. Vic's Hobby Shop, 605 S. Halliburton, Kirksville, Mo.

WHOLESALE Directory, Mailorder Course ($2 value), 25c (coin). Floyd's, 515 Stagg, Ville Platte, Louisiana.

TYPEWRITERS, Sewing Machines can earn excellent spare time profits. Free details. McKinley, PS, Box 651, Canton, O.

BIG Profits In Spare Time! I'll send, on Free Trial, Assortment Full-Size Samples fine Foods Household Necessities to ambitious Men-Women who need money. Friends, neighbors buy eagerly. Send no money. Just write Blair, Dept. 55MH-2, Lynchburg, Va.

HOME Mailers earn sparetime cash mailing our advertising literature. Jennings, 1540 First, Sarasota, Florida.

WHOLESALE catalog gems cultured pearls and jewelry creations, beautifully illustrated catalog 50c. Diagem Jewels, Hampton Bays 10, New York.

HUGE Profits! Operating mail order business write Steinbergen, 1274-A Stebbins, New York City 59.

TRIPLE your profits. Let me write your sales letters and catalog. Advice free. Winslow—Suite 635-B, 4980 Marine Drive, Chicago.

MAILORDER advice for beginners. 1,000 words only a dime. L. B. Craig, Southern Pines 7, North Carolina.

FREE Folio describing "$45,000; Unlimited Vacations Plan." No canvassing, mailorder, merchandise, equipment. Unknown. Works itself—home! Keep job. Haylings-PS, Carlsbad, Calif.

EARN Extra Income at home. Honest, dignified, steady self-employment. Local or mailorder. Graham Company, 1234 Granger Ave., Lakewood 7, Ohio.

SAVE $$$! Listing of 10 Wholesalers $1.00. Box 43 Oshkosh, Nebraska.

$50 PER day $1. brings details. 2003 Porter, Stockton, California.

PRINTING and Office Supplies Wholesale. 20,000 items. Literature free. Royal, Box 368-S, Cleveland 27, Ohio.

$35 WEEKLY addressing envelopes. Instructions $1, refundable. Adservice, Spring Valley 36, New York.

EARN Money Evenings, copying and duplicating comic cartoons for advertisers. Adservice, Argyle 2, Wisconsin.

START A Buying Service, buy wholesale thousands nationally advertised products. Make big profits selling at sizeable discounts. Postcard brings details. American Buyers' 630-S Linden, Buffalo, N. Y.

SPARE Time Money plus New Car as encouragement bonus. Amazing 60 gauge nylons 3 pairs guaranteed 3 months. Write Wilknit 2046 Wash., Greenfield, Ohio.

GET latest money-making opportunities, send 20c. Conrad, Box 301, Seattle, Wash.

FREE Book "505 Odd Successful Businesses." Work Home! Expect something Odd! Pacific-35C, Oceanside, Calif.

MONEY found. Be our agent in your community. Top quality watches, diamonds, jewelry, etc. at wholesale prices. Amazing profits. Experience unnecessary. Send for Free catalog. Zerah Brothers, 602 Mission Street, Dept. 341, San Francisco 5, California.

$200 MONTHLY Possible Raising Earthworms! Backyard, Garage, Basement. Complete, Illustrated Booklet explains raising, feeding, packing, marketing. 25c postpaid! Ozark Worm Farm-V, Willow Springs, Missouri.

ALUMINUM Awnings. Sell yourself. Sell neighbors. Factory prices. Write All Weather, Box 10254, Tampa, Florida.

SELL by mail! Profitable spare time business. Informative 40 page booklet 25c. Beecher Publications, Box 2161-E, Cincinnati 1, Ohio.

SUCCESS is easy if you know how. Increase pay and sales 25 to 50%. Send $1.00 for plan. Guaranteed. Consultant, P.O. Box 2205, Fort Wayne, Indiana.

WE raise Chinchillas in our basement, very profitable sideline, write for brochure. Merrill Hendrickson, Franklin, Ind.

MUSIC at your door!—Can put dollars in your pocket! Sensational new chimes plays favorite melodies. Sells on hearing. Only $9.95. Details Free. WestWin, 647-A Goulding, Winnipeg, Canada.

$13.50 PER Thousand Possible for home addressing. No selling. Details for stamp. Hicks, Box 37215-PS, Los Angeles 37.

SELL your friends conversational test and course, marriage and child training aids. Samples $1.00 sell for $2.00. Winkler Psychological Publications, Dept. P-1, 15095 Tracey, Detroit 27, Michigan.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The August issue closes on June 25. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 554, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

ADDRESS Envelopes. Send Stamped Envelope for information to Box 1428, Mobile, Alabama.

MAKE money at home. Write. Falcon House, Winnebago 4, Illinois.

RICHES, sensational newsletter, tells how and where big money is being made all over world. Send $1 for special 3 month trial subscription. Riches, Box 30, Mt. Vernon, New York.

39 FORMULAS, PLANS, ETC.

FORMULAS—All kinds. Latest products. Literature free. Kemico, Park Ridge 15, Ill.

REAL Manufacturing Formulas Lists Free. Cumming, Chemist, Gordon Avenue, Syracuse 4, New York.

MILLER'S modern manufacturing formulas make fast selling products that get the business and pay! Fifty years supplying the best. Late literature free! Lipscomb Miller, chemist, Tampa, Florida.

ANY Formula $3.00. Catalog — Mfg. Treatise 10c. J. Belfort, 192 N. Clark, Chicago 1.

ANY Formula $5.00. Satisfaction guaranteed. Jack, Chemist, 5138 Gainor, Philadelphia 31.

FREE Formula Catalog. Anything analyzed $35.00. Western Chemical, Salem, Ore.

MONEY-Making formulas—440 pages. $1.98 postpaid. Dobels, Box 120, New York 10.

40 PLASTICS

PLEXIGLAS. Lucite. Any size sheets. Square foot (12x12) cost, 1/16", $1.18; ⅛", $1.55; 3/16", $1.90; ¼", $2.25. Add 15% for postage. Minimum order $3.00. Almac Plastics, 600 Broadway, New York City.

PLASTICS home-craft course for Men and Women. Tells and shows how to make hundreds of fast selling plastics products. All plastics and materials for 23 projects included in course. No special tools needed. Course pays for itself. Write for Free booklet. Interstate Training Service, Dept. D2-F, Portland 13, Oregon.

NEW liquid casting plastic. Clear, colors. Preserve flowers, insects, photos permanently. Saw, drill, carve. Send 25c for Castolite Casting Manual and proved Success Plan showing how to make money at home. Castolite, Dept. G-102, Woodstock, Illinois.

PLEXIGLAS sheets—cut to size—clear, all thicknesses—standard outdoor translucent colors. McClarin Plastics, P.O. Box 168B, Hanover, Pa.

PLASTIC Sheets, Rods, Tubes; etc. Free List. Plastic Supply Co., 2901 N. Grand Blvd., St. Louis 7, Mo.

FIBERGLASS-resin materials included in our complete plastics catalogue. Van Horn Plastics, 1905 Ingersoll, Des Moines, Iowa.

FIBERGLAS, Polyester, Plexiglas, Acetate, Vinylite: Casting, coating plastics: Maurice Lannon's Fiberglass "How" book now ready—$2.50. Fast service, best prices. Catalog—10c. Gem-O'-Lite, Box 6868P, North Hollywood, Calif.

TWO interesting new plastics for your fun, write Science Now Company, R-2, Catskill, New York.

41 CHEMICALS & APPARATUS

NEW Idea Chemical and Apparatus Outfits for Home Experimenting Photo-Scales, Microscopes, Chemicals, Biological and Laboratory. Supplies in Small Quantities. Catalog 25c. Established 1931. John H. Winn, 124-B West 23rd Street, New York, N.Y.

AMAZING New Book of Science, Experiments, Formulas and catalogue of Laboratory Supplies. Only 25c. National Scientific Co., Dept. PS6, 2204 W. North Ave., Chicago 47, Illinois.

NEW Catalog: Chemical, Biological, Mineralogy. 10c—refunded. Hagenow Laboratories, 2414 Clark Street, Manitowoc, Wisconsin.

Copyrighted material

ILLUSTRATED Catalog: Chemistry, mineralogy, biology 20c. Tracey Laboratories, Evanston, Illinois.

CHEMICALS and apparatus for industrial, analytical and private laboratories. Catalog 25c. Dept. M-26, Biological Supply Co., 1176 Mt. Hope Ave., Rochester 20, N. Y.

CLOUD Chambers, $8.50. Write for free specifications. Atomic Laboratories, Box 343, Berkeley, California.

42 HELP WANTED

FOREIGN Employment Construction Work. If interested in foreign projects with high pay, write Foreign Service Bureau, (Dept. P.S.), Metuchen, New Jersey.

FOREIGN & Latin American Employment 1954 "Foreign Service Directory" gives Up-To-Minute Facts on Military & Civilian Construction, Government Jobs, Major Oil Listings, Aviation, Transportation, Steamship Lines, Mining, Importers, Exporters, How-When-Where to apply application forms. Hot List Firms Hiring. $1.00 postpaid. Global Reports, Box 883-S, Hollywood 28, Calif.

ALASKA!! Last American Frontier. $1.00 brings 1954 Business Directory & Government Map. Military & Civilian Construction; Homestead & Highway facts; Mining, Aviation, Fur Farming, Grazing, Timber. Travel directions. List of firms hiring. How to apply. Alaska Opportunist, Box 92-S, Hollywood 28, Calif.

FOREIGN Job News and Domestic. Send $1.00 for World Wide Construction Projects, How-When-Where to apply. Global Reports Monthly, Box 883-Sx, Hollywood 28, Calif.

ADDRESS Advertising Postcards. Must have good handwriting. Box Nine, Watertown, Mass.

TUCSON or Phoenix Daily employment listings $1.00 each airmailed. Arizona Opportunities, Box 7304, Tucson 3, Ariz.

JOBS On Ships. High Pay. Great Lakes-Ocean. Exp. unnecessary. Ages 16-55. Travel Paid. Stamped Self-addressed env. brings reply. Ship Opportunities, 2H Waseca, Minn.

WANT a job? Try freak ads. Others have. Sample ads with instructions only $1. Phil Bruce, Box 341-PS, Palo Alto, Calif.

ARTISTS, draftsmen—Government jobs, latest openings! Clarke, 2507 Arl., Arlington, Va.

FOREIGN & Domestic Jobs. High pay to $14.000 Fare Paid. Alaska, So. America, Spain, Australia, etc. Jobs in U.S.: 1000's them open. Excellent Pay. Trades, Office workers, all types. Unskilled, Skilled, Factories, Construction, etc. Stamped Self-addressed env. brings reply. Foreign Opportunities, 2H Waseca, Minn.

KANSAS City cries for skilled, unskilled help Help Wanted columns air mailed $1.00. Martin Supply, Tarkio, Mo.

JOBS in U.S.A. Construction, skilled to $4.12 hourly. Carpenters, $3.55. Electricians, $3.60 Laborers, $2.40. Civil service openings, $3.400-$10.800 yearly. Labor Shortage Areas. Plus. U.S.A., Canada jobs underway, current wages, where to apply. 217 reports this issue. Printed, illustrated, $1.00 (Airmail, $1.35). White Pass Reports (CX-01), Box 716, Cody, Wyo.

FOREIGN Job Listings, application forms, etc. $1.00. World Wide Listing Service, Box 5234, Chicago 80, Ill.

TULSA! Help Wanted columns airmailed $1.00. Thompson, 320 East Zion, Tulsa, Oklahoma.

JOBS Overseas! Skilled, $220 weekly. Foremen, $250. Plus bonuses. Tax free. Transportation, overtime. Four year project. 23 firms seeking construction men, clerks. Spain airbase details. 269 projects, 52 countries. 48 page, printed, plastic-bound manual, applications, everything, $1. Jobservice D-1, Box 30, Billings, Montana.

FABULOUS Canadian West. Large construction and other projects. Men, Women, job listings airmailed $1.00. Box 564, Edmonton, Alberta.

"LATEST Copyrighted Reports!!" Who to contact for highest paying jobs in over 38 countries, including U.S., Spain, South America, Alaska, Europe, Africa, Canada, etc. Listings of employers with contracts who hire skilled, unskilled professional, supervisory, clerical, trades, laborers, many others. Pay up to $1550.00 monthly. Also best oil, aviation, mining opportunities. Only $2. Airmail $2.25. (COD's $2.50). Includes one year registration and advisory service. Application forms. We can help you find employment. Only service with unconditional guarantee of satisfaction or money back. Immediate service. International Reporter, Box 1047-SD, St. Louis 1, Missouri.

FOREIGN And American Employment!! Latest digest of firms to contact. High pay. Overtime. Transportation Expenses. Most all Trades, Professional and Clerical. Also best Oil, Aviation and Steamship Contacts. Special report on Spain, Alaska and Canada. Satisfaction or Money Refunded. One-year registration and advisory service. Send $2.00 or C.O.D. plus postage. Associated Services, Box 58-RL, Alton, Illinois.

$1300 MONTHLY for truck drivers, $1400 monthly for carpenters, electricians, plumbers, mechanics, $1200 for clerks and laborers. Replacement hiring now being done. Full information and complete foreign listings, with current information on Spain, Korea, Australia, Alaska & Canada, $1.00. 25.000 men and women needed for new stateside project! Complete information and other domestic listings, $1.00. Dept. 4-F, Opportunities Unlimited, 1110 Commerce Bldg., St. Paul, Minnesota.

INDUSTRIAL Bridgeport, Connecticut. Classifieds Airmailed, $1. Dunning's PS-2, 1980 Huntington Tpke., Trumbull, Conn.

MONTREAL—"Help Wanteds." question answered. $1.00 airmailed. Kennedy, 751 Kenaston Montreal 16, Canada.

THOUSANDS of opportunities will be available on the St. Lawrence Seaway Project. Get vital information now, $2.00. Ellis Enterprises, Box 298, Station-H, Montreal, Canada.

ALASKA, Pacific, Far & Middle East. $500 to $1500 month. Job list firms now hiring $1.00. Pacific Service, Box 115, Seattle 1, Washington.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The August issue closes on June 25. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 554, Popular Science Monthly, 353 Fourth Ave., New York 10 N. Y.

EMPLOYMENT SERVICES

CONSTRUCTION Job List Published Monthly $1.00. Dempster's Construction Scout News, Dept. 268-VY, Bridgeport, Ill.

FOREIGN Jobs. Contracts underway and soon starting in Africa, South America, Canada, England, Europe, South Pacific, Middle East, Mexico and Alaska. Send $1.00 for foreign job news, information, application forms, etc. DCS Foreign Job News, Dept. 268-VZ, Bridgeport, Ill.

OVERSEAS Jobs. Big pay, transportation, expenses Clerical, professional, mechanical workers. Most all trades. Latest listings aviation industry, construction, manufacturing, oil companies, government agencies, many other opportunities. Up to date information on securing employment, contracts, income tax, application forms, $1.00. Overseas Jobs, Box 67-J2, Vincennes, Indiana.

43 AGENTS WANTED

AGENTS—300% profit selling genuine gold window letters; stores and offices. Free samples. Metallic Sign Letter Co., 431-E North Clark, Chicago.

START Your Own Business on credit. Your own boss. 1658 of our Dealers sold $5.000 to $27.500 in 1953. We supply stocks, equipment on credit. 200 home necessities. Sales experience unnecessary. Pleasant, profitable business backed by world-wide industry. Write Rawleighs, Dept. F-U-PSC, Freeport, Ill.

NEW Jobs—open in selling! Send name, address for five free issues of Opportunity Magazine's money-making guide, listing hundreds of companies who'll pay you well, full or part-time. No experience needed. Opportunity, 28 E. Jackson, Dept. 18, Chicago 4, Illinois.

ABSOLUTELY Free—Sales Kit. Yours for the asking. Send postcard today requesting kit showing new line, belt buckles with your name or personal initials, cap badges, choice 3000 different emblems. Write Hook-Fast, Box 1425PS, Providence, R. I.

BUY Wholesale—25.000 items—Catalog 25c. Matthews, 1472-A9 Broadway, New York City 36.

GOLD or Silver letters, numbers. Windows, Doors Trucks. 1" to 6". 500% Profits—Free Samples. Atlas-U, 544 West 79th, Chicago 20.

HAVE you spare time? Terrific lifetime income. International, 61B Roberts, Portland, Maine.

IS $210 a week worth a postcard to you? Then rush card with name and address for special Free Trial Plan that sells amazing new Automatic Refrigerator Defroster "like hot cakes!" Write to Mr. Lewis, D-Frost-O-Matic Corp., Dept. P-103, 173 W. Madison, Chicago 2, Illinois.

CALENDARS, Advertising Novelties, Matches. All styles, including Religious, Varnished, 12 sheet, Girls. Hundreds of Advertising Novelties, Book Matches, etc. Fleming Calendar Co., Promotional Division, 6539 Cottage Grove, Chicago 37, Ill.

MAKE Money At Home as renewal headquarters for all magazines. Liberal commissions. No experience—No capital needed. Supplies furnished. Write for Free Catalog. McGregor Magazine Agency, Dept. 510A, Mount Morris, Illinois.

ADDRESS Advertising Postcards. Must have good handwriting. Box Nine, Watertown, Mass.

GOOD man can make $3.000 next 90 days. Every house in town wants amazing NiLite glowing curbside numbers. Automatic free trial plan pays profits day after day. Write for free details. NiLite, 173 W. Madison, Dept. 302, Chicago 2, Ill.

SAVE! Make Big Money in Sparetime. Buy nationally advertised merchandise Wholesale. Catalog 25c, refundable. A Sales, 18-PS City Terrace, Newburgh, N.Y.

HAVE a complete store in your pocket. Buy wholesale and make big profits. Send for free general merchandise catalog now. Jay Norris, Dept. PS, 445 Broome St., New York City.

AGENTS—Men or Women. Instant selling Household-Garden Glove. Complete sales kit $1.00 (refundable). Carolina Beauty Supply, High Point, N. C.

SENSATIONAL Wholesale watches, rings, appliances. 1954 catalogue 50c. International Sales Company, 175-BA Fifth Avenue, New York 10.

CALIFORNIA sweet smelling beads, sensational sellers. Particulars free. Mission, 2328P West Pico, Los Angeles 6, Calif.

BEAUTIFUL Feather Pictures. 200% Profit! Free sample. Apartado 9036, Mexico 1, D. F.

MONEY For Xmas! Make $50 and more during spare time. Friends, neighbors—everyone buys from Elmira's exquisite New Sparkling Line. Imprinted Christmas Cards for As Little as 3c. Personalized Stationery, Napkins, Large Gift Wrappings with Free accessories, Ribbon Ties . . . all fine quality Money Saving Values. No experience Needed. Send Name and Address for Free Portfolios, Catalog, Assortments on Approval, Bonus Plan. Elmira's "Portable Gift Shop" Makes Money First Day. Write Today. Elmira Greeting Card Co., Dept. C-202, Elmira, New York.

Copyrighted material

MAKE Money Introducing World's cutest children's dresses. Big selection, adorable styles. Low prices. Complete display free. Rush name. Harford, Dept. L-7341, Cincinnati 25, Ohio.

SALESMEN—$50.00 in a day definitely assured selling brand new item going to every type of food and beverage store, factories, laboratories, hospitals, etc. Samples Furnished. Utility Durawear, 53 West Jackson Blvd., Dept. PS-6, Chicago 4, Ill.

IT'S so terrific you'll actually sell Thousands! Brand new $2.95 pocket check protector. Sales pouring in. A tremendous deal for you. Get your town today. Federal Products, Evanston 15, Illinois.

SENSATIONAL Insect-O-Lite destroys insects by vaporizing chemical with heat of electric bulb. Retails for $6.95. 100% profit for Agents. Insect-O-Lite Co., Cincinnati 6, Ohio.

LEARN where millions in profits from Bible sales have gone! Receive free proven sales course and whole story of how you can get these profits! Also free catalogue of six of the world's finest Morocco Grain Genuine Leather covered Bibles and related items! Joseph W. Cain, Wholesaler, Box 5065Z, San Antonio 1, Texas.

OPERATE "Escolator" Mailorder System, selling our products or any products. Fastest, most revolutionary mailorder system known. Write: Selbyco, Decatur 21E, Illinois.

$500 MONTH. Sales-service. Power mowers. Leads furnished. Terms. Farmco-PS, Excelsior Springs, Missouri.

FREE Folio describing "$45,000; Unlimited Vacations Plan." No canvassing, mailorder merchandise, equipment. Unknown. Works itself—home! Keep job. Haylings-PS, Carlsbad, Calif.

MAN to earn $150 up per week. Long Needed invention. Advertised worldwide. Prospects everywhere. Full or part time. Exclusive. No investment. Free use of samples. Write Red Comet, Inc., Dept. 328M, Littleton, Colorado.

EASY Extra Income—Sell Sensational New Silicone Scorch Resistant Ironing Board Cover. Good Housekeeping Approved. Terrific $1.98 seller! Send for Free complete selling Kit. Sample cover $1.10. Menell Products, Dept. X-P.O. Box 431, Midtown Station, New York 18, N. Y.

$1.00 PROFIT selling $2.95 photo enlargement offer. Allen Studio, Reigler Bldg., Little Rock, Arkansas.

EASY handwork makes fast-selling useful articles. Sample free. Sunmade Company, Brockton 64, Mass.

BUY Wholesale thousands nationally advertised products at big discounts. Free "Wholesale Plan." American Buyers', 629-S Linden, Buffalo, New York.

FREE hosiery! Sensational new way to earn $3 hour in spare time! Introduce amazing hosiery by giving away free pairs to every man and woman (regardless whether or not final purchase is made) just to prove how good they are! Wonderful luxurious nylon stockings, guaranteed against runs and snags, nationally known —sold coast to coast. New miracle one size two-way stretch men's nylon hose, contains no elastic, yet fits every size foot from 9 to 14! Never sags or droops—clings to foot like second skin—Outlasts several pairs ordinary hose and guaranteed one full year! Money or experience unnecessary. Buy nothing. Deliver nothing. Advance cash plus huge cash bonus to 40%. Your own hose as extra bonus. Special manager plan so you can appoint agents. Nothing like this ever offered before. Samples of stockings and miracle socks with complete money-making outfits free and prepaid. Nothing to pay now or later. Absolutely no obligation. Simply mail postcard with your name and address. Kendex, Babylon 54, New York.

BIG Money Now—with sensational new product that will puncture proof auto and truck tires in minutes! Amazing demonstration. Every motorist needs, wants, buys! Write for money-making details. Everlast, Dept. A-11, Consumers Bldg., Chicago 4, Illinois.

FREE book "505 Odd, Successful Businesses." Work home! Expect something Odd! Pacific-38C, Oceanside, Calif.

MEMO Blotters-Billfold Secretaries Dynamic advertising mediums. Big commissions. Excellent repeats. Peters Associates, Vandalia 1, Ohio.

MAKE Extra Money. Sell front door name plates to friends, neighbors. Retail $1.98—you make $1.00! Free selling kit. Modern Engraving Co., P.O. Box 194, Boston 14, Mass.

BUY Wholesale—Hundreds Nationally advertised products—Watches, Housewares, Jewelry, Appliances, etc. — Save — Make Money — Free Details. National Buying Service, Radio City Station, Dept. S, Box 324, New York City 19, N. Y.

MEN! Money! Miracle Spray-A-Tint tints windshields—gives marvelous glare-protection—plus new 1954 look! Sprays on in jiffy. Reduces glare from sun, snow, headlights, etc. Lasts for years. Auto, truck owners buy on sight! Profits 100% up! Spray-A-Tint, Dept. PS-5, Consumers Bldg., Chicago 4, Illinois.

WHOLESALE Catalog. Name Brand Appliances, cameras, watches, etc. Pette Co., 1554-PS West 11 St., Brooklyn 4, N. Y.

CASH in on tremendous demand. Low priced burglar Alarm for cars, homes, farm buildings. 286% profit. Unique sample offer. Northwest, PS6, Pukwana, S. Dak.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The August issue closes on June 25. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 554, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

44 HIGH-GRADE SALESMEN

ADVERTISING book matches—Cash in on big demand—sell Union label matches. Cuts for all businesses and political parties—Free powerhouse selling kit—low prices—protection guaranteed on repeat orders—Cash commissions. Superior Match Co., Dept. P-654, 7530 Greenwood, Chicago.

AD Matches! Sell Amazing Designs—20, 30, 40 and 240-light book matches. Biggest spot cash commission; every business a prospect. Low prices for high quality. Repeats. Start without experience; men, women; full, part time. Buy Nothing! Sales kit furnished. Match Corp., Dept. PS-54 Chicago 32, Illinois.

45 EDUCATIONAL & INSTRUCTION

USED Correspondence Courses and Books sold and rented. Money back guarantee. Catalog free. (Courses Bought.) Lee Mountain, Pisgah, Alabama.

BOOKKEEPERS! Increase your earnings! Operate your own simplified "Dollar-A-Week" Bookkeeping and Tax Service. Full or spare time. Details Free. No obligation. Ellis, Box 203, Cedar Grove, North Carolina.

WANT A Diesel Job? New Opportunities to increase income. Higher Pay. More Money. We can help you Qualify. Tools. Shop method home training. Write today! Diesel, Tractor, Heavy Equipment Division, Interstate Training Service, Dept. B2-F, Portland 13, Oregon.

COMPLETE Your High School at home in spare time with 57-year-old school. Texts furnished. No classes. Diploma. Information booklet free. American School, Dept. A46, Drexel at 58th, Chicago 37, Ill.

BE a Real Estate Broker. Study at home. Write for Free Book today. "G.I. Approved." Weaver School of Real Estate, 301 Law Bldg., Kansas City, Mo.

HIGH School diploma at home. Licensed teachers. Approved materials. Southern States Academy, Box 144 PX, Station E, Atlanta, Georgia.

LEARN Drafting—Write for free booklet, "Drafting Opportunities In Industry." Cesco Industrial Training Services, 1704-B Frederick, Fort Worth 7, Texas.

PRACTICAL Nursing—Learn Easily at Home, Spare Time. Big Demand, good earnings. High School not necessary. Write for free facts. Wayne School, Dept. FH-24, 2525 Sheffield, Chicago 14, Ill.

INCREDIBLE! Become Mental Superman Overnight! Free Booklet! Bijou, Box 1727-VL, Hollywood 28, California.

STUDY by correspondence for Doctor's degree in Psychology, Metaphysics, and Divinity. College of Divine Metaphysics, Dept. P-S, 2811 No. Illinois Street, Indianapolis 8, Indiana.

GIANT government surplus course: "Fundamentals of Selling." Nearly 600 pages selling secrets! Big workbook included! $1.00. Jack's Surplus, 272 Central, Rockland, Mass.

MEDICAL Laboratory Technique. Learn at home. Catalog free. Century College, 9 East Ohio, Chicago, Illinois.

BECOME a Tax Expert. Write: Professional School, 1416P/S Maile, Cleveland 7, Ohio.

WELDING training pays at Hobart Welding School, Box P-641, Troy, Ohio. VA Contract. Best equipment. Catalog Free.

WHY Don't You Write? Writing short stories, articles on business, sports, hobbies, travel, etc. will enable you to earn extra money. In your spare time at home, we teach you to write the way newspaper men learn—by writing. Free "Writing Aptitude Test" tells whether you possess the fundamental qualities essential to successful writing. Write today! Newspaper Institute of America, Suite #5664-H, One Park Ave. New York 16, N. Y.

BECOME a Doctor of Psychology or Metaphysics. Learn secret of contentment, happiness. Win degree of PsD. or MsD. Solve mental worries. Free book. College of Universal Truth, 5038-K Broadway, Chicago.

MEDICAL Laboratory Technicians in great demand. We train you in your own home. Catalogue free. Imperial Technical Institute, Box 973-B, Austin, Texas.

EARN While You Learn Auto And Diesel Mechanics. Master this top paying trade. Many graduates earn $100 a week and up. Approved for Korean veterans. For free information write Dept. No. 262, Nashville Auto-Diesel College, Nashville 3, Tenn.

FREE home study course in basic economics, offered as a public service. Recommended by many leaders. Send postcard for complete information. Henry George School, Dept. P, 50 E. 69th Street, New York 21, New York.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay $3.50 lb. We paid Babbitt $4,165.00 in few weeks. Free Book. Washington Mushroom Ind., Dept. 180, 2954 Admiral Way, Seattle, Washington.

GOVERNMENT Position! Home training for Examination. $9.95—Refunded if you don't pass. Write. Ozment Instructions, 37-CS-Box 665, St. Louis, Missouri.

PIANO Tuning Pays. Learn this profitable profession at home easily with patented Tonometer and mechanical aids. No knowledge music necessary. Diploma granted. Veteran approved. Write for booklet. Niles Bryant School, 3731 Stockton Blvd., Dept. S, Sacramento 20, Calif.

EDUCATIONAL books, correspondence courses, bought, sold, rented. Free Catalog. Willard Bayles, 211 Essex, Hackensack, New Jersey.

LEARN mathematics at home. Individualized instructions. NCS, Box 27, St. Johns Station, Brooklyn 13, New York.

"LIGHTNING Shorthand" 50% easier than "Best." None faster. Best writers use "Lightning." Course $1.00. Ray Jenkins, Station Hotel, Erie, Pa.

SIMPLIFIED method teaches algebra instantly. $1; guaranteed. Ziemben, 6123 Orchard, Dearborn, Michigan.

EZ Shorthand, $2. Bowers, 415 West 44, New York 36.

Copyrighted material

CORRECT Your thinking and change your life! Write Bert King, Box 7C, Main Office, Louisville 1, Kentucky, U.S.

MIRACLES via Subconscious Control. Free Autodynamic Brochure. Box 847, Ocean Park, Calif.

RECOGNIZED College Degrees through home study. Tahoe Colleges, Box 912, Reno, Nevada.

46 CONTESTS

CONTESTANTS! Puzzlers! We help you write your entries and work out your puzzles and tiebreakers. Contests, 13 Earl, Red Bank, New Jersey.

SURPRIZES Galore!!! Fabulous Home Income Opportunity! Long established contest hdqtrs. Send stamp! National Contest Bulletin, Box 2685-PS, Miami 16, Florida.

47 DETECTIVES

DETECTIVES—Work home—Travel. Experience unnecessary. Detective Particulars free. Write, Wagoner, P-125 West 86th, New York 24.

INVESTIGATOR Training. Experience unnecessary. Many opportunities. Send for Free particulars. Free credentials. Exchange Secret Service System, 4360 Broadway, Chicago 13, Illinois.

DETECTIVE Training. Phillips Secret Service System. 1917-C North Kenneth, Chicago 39, Ill.

48 LANGUAGE OUTFITS

IT'S Fun Learning A Language by Linguaphone. At home, easily master French, Spanish, German, Italian—29 languages by Linguaphone World's Standard Conversational Method. It's like living in another land, you listen—you hear men and women speak—you understand—you speak. Save time, money. Gain job, school, travel, cultural opportunities. Write for Free Book. Linguaphone Institute, 5406 RCA Building, New York 20.

50 BUSINESS SERVICE, INFORMATION, NAME LISTS

MAILING Lists, most any classification. 1000 names $5.00. 1000 your circulars mailed with ours $4.00. 5000 your circulars printed and mailed $12.95. Write Dixie Mailers, King, North Carolina.

CAPITAL raised or no cost. Tucker, 3633 Warder Street, N.W., Washington 10, D.C.

LOS Angeles receiving forwarding service. Letters reairmailed 25c. Strictly confidential. Inquiries welcome. John P. Nolan, Box 266, Norwalk, California.

51 SPECIAL SERVICES

LETTERS remailed your choice Brasil—Trinidad — Venezuela — Uruguay — Argentina. $1.00 Postcards 2 for $1.00. Szabo, Avenida Atlantica 792, Rio de Janeiro, Brasil, S. A.

NOT Selling? Tell us Product-Talk-Door-Store-Where. One item $1.00—"Sales-Aids." P. O. Box 1023, Turlock, Calif.

52 AUTHORS SERVICE

NO luck finding a book publisher? Write for Free Booklet PS. Vantage Press, 120 West 31st, New York.

BEGINNING Writers: Get $1 to $20 checks daily writing simple children's stories, articles, poetry in your sparetime. Experience unnecessary. Our instructions reveal how. Details Free. W. Herman, 5927 Euclid, Cleveland 3, Ohio.

HOW To Write short stories, mysteries, articles. Learn at home for career or extra part-time income. Graham Doar sold one story to Post, CBS Radio and NBC-TV. Professional writers show you how. Send today for free lesson. Palmer Institute of Authorship Desk UM-64, 1680 North Sycamore, Hollywood 28, California.

BOOK Manuscripts Invited—Co-operative publishers since 1925. Meador Press, 324 Newbury St., Boston, Mass.

53 ADVERTISING, AGENCIES, ETC., FOR ADVERTISERS

BEFORE Advertising—get instructive Ad-Guide and Ratebook, 10c. Ideas developed. Advertisements prepared free. Chicago Advertising Agency (Established 1900), Chicago 4.

ADDRESS Advertising Postcards. Must have good handwriting. Box Nine, Watertown, Mass.

500 RADIO Stations which accept advertising on commission and 200 Magazines which give Free publicity. Including instructions "How"—$2.00. Satisfaction guaranteed. Brass, Box 1664-PS-4, Chicago 90.

FOREMOST Canadian classified outlet. Latest issue $1.00. Kennedy, 751 Kenaston, Montreal 16, Canada.

54 CARTOONING, SIGN PAINTING, CHALK TALKS

"HOW To Make Money With Simple Cartoons"—A book everyone who likes to draw should have. It is free; no obligation. Simply address Cartoonists' Exchange, Dept. 196C, Pleasant Hill, Ohio.

CARTOONISTS: Amateur, Professional. Prepare for Animation with Max Fleischer's plan. Write Vera Coleman, 60 East 42nd Street, New York, N. Y.

CHALK Talks, Laugh Producing Program, $1.00. Illustrated Catalog 10c. Cartoonist Balda, Oshkosh, Wisconsin.

MAKE Money. Learn Sign Lettering in few minutes. Copyrighted system. Write for Free lesson. Hub Art Center, 84 West Newton St., Boston 18, Mass.

55 TYPEWRITERS & OFFICE MACHINES

TYPEWRITERS. Printing Devices. Office Machines, supplies, appliances. Dixie Graph, King, North Carolina.

56 RUBBER STAMPS & OFFICE SUPPLIES

3 LINE rubber stamp, self inking pad, plastic case $1.00, extra line 35c. William C. Anderson, Mountain Home, Tenn.

3 LINES, $1.00. Fast Service! Catalogue. Johnson Press, Box 6-B, N.Y.C. 26.

57 PRINTING, MULTIGRAPHING, ETC.

BUSINESS, Personal Printing. Catalogs Free. Howprint, 723-S Eunice, Webster Groves 19, Missouri.

ILLUSTRATED Postcards! $8.90 Thousand. Samples Free! American Devices Company, 164 Montague, Brooklyn 1, N. Y.

JOB Printing—Letterheads—Envelopes—Circulars. Printing, 21 Barclay, Portsmouth, Virginia.

OFFSET printing, $6.50-1000, 8½x11, 16 lb. National Letters, 1457 Broadway, New York 36.

DISTINCTIVE Printing. Samples, prices free. McIlvaine, Box 86-PS, Brooklyn 30, New York.

58 PRINTING OUTFITS, SUPPLIES

DO your own printing. Save money. Simple rules. We supply everything. Print for others; good profit. Raised printing like engraving, too. Have home shop. Details free. Kelsey Presses, V-8, Meriden, Conn.

PRESSES, Supplies, Rubber Stamp Machines. Catalog 10c. Box 211-S, Springfield, Missouri.

MAKE Your Own self molding rubber printing cuts. Plexirubber, Argyle (2), Wisconsin.

PRINTING Presses, Type Supplies. Lists 3c. Turnbaugh Service, Loysville, Penna.

DO wonders with finest small-cost printing outfits. Send 25c for Booklet shows dozens of ways to enrich spare time, bank account, doing profitable print jobs. Easy rules, print in 1 day. We supply presses, etc., factory-to-you. Have your own business, do church, club, commercial work, etc. Craftsmen M'chy Mfrs., 533 Atlantic Avenue, Boston, Mass.

59 PATENT ATTORNEYS

C. A. Snow & Co.—S-427, Snow Building, Washington 1, D. C. Registered Patent Attorneys. Write for information.

INVENTORS. For "Invention Record" form, contact Carl Miller, Registered Patent Attorney, Woolworth Building, N. Y.

INVENTORS: Without obligation, write for information explaining the steps you should take to secure a Patent. John Randolph, Registered Patent Attorney, 207 Columbian Bldg., Washington 1, D. C.

REGISTERED Patent Attorney offers services. Sanders, 6430 Evans, Chicago 37, Illinois.

INVENTORS: Learn how to protect your invention. Special booklet "Patent Guide for the Inventor" containing detailed information concerning patent protection and procedure together with "Record of Invention" form will be promptly forwarded to you upon request—without obligation. We are registered to practice before the U.S. Patent Office and prepared to serve you in the handling of your patent matters. Clarence A. O'Brien & Harvey Jacobson, Registered Patent Attorneys, 42B-D District National Building, Washington, D. C.

INVENTORS—Send today for booklet "Patent Protection for Inventors" giving detailed patent information and preliminary steps to take toward patent protection, also "Evidence of Invention" form. Victor J. Evans & Co., 941-G Merlin Building, Washington 6, D. C.

INVENTORS—If you believe you have an invention, we can make a preliminary search on your invention and advise you whether we think it can be patented. Send for copy of our Patent Booklet "How to Protect Your Invention" and "Invention Record" form. No obligation. McMorrow, Berman & Davidson, Registered Patent Attorneys, 1439 Victor Building, Washington 1, D. C.

"INVENTOR'S Guide" and "Record of Invention" free on request. Frank B. Ledermann, 154 Nassau Street, New York City.

PATENTS—Irving L. McCathran, 316 McLachlen Bldg., Washington 1, D. C. Registered Patent Attorney.

INVENTORS: When you are satisfied that you have invented something of value write me, without obligation, for information as to what steps you should take to secure a Patent. Write Patrick D. Beavers, Registered Patent Atty., 938 Columbian Bldg., Washington 1, D. C.

60 FOR INVENTORS

INVENTORS. For "Invention Record" form, contact Carl Miller, Registered Patent Attorney, Woolworth Building, N. Y.

INVENTORS—Send for free patent information book and inventor's record. Registered Patent Attorney, Associate Examiner, Patent Office 1922-1929; Patent Attorney & Advisor, Navy Department 1930-1947. Gustave Miller, 64PSI Warner Building, Washington 4, D. C.

INVENTIONS Promoted. Patented or Unpatented. Established 1911. Write Adam Fisher Company, 5418 Idaho, St. Louis, Mo.

INVENTORS: Without obligation, write for information explaining the steps you should take to secure a Patent on your invention. John Randolph, Registered Patent Attorney, 206 Columbian Bldg., Washington 1, D. C.

INVENTORS, if you have an invention for sale, patented or unpatented, write Institute of American Inventors, Dept. 30A, 631-E St., N.W., Washington 4, D. C.

INVENTORS: Learn how to protect your invention. Special booklet "Patent Guide for the Inventor" containing detailed information concerning patent protection and procedure together with "Record of Invention" form will be promptly forwarded to you upon request—without obligation. We are registered to practice before the U. S. Patent Office and prepared to serve you in the handling of your patent matters. Clarence A. O'Brien & Harvey Jacobson, Registered Patent Attorneys, 42A-D District National Building, Washington, D. C.

Copyrighted material

INVENTORS—If you consider your invention to be something of importance, take steps to protect it with a United States Patent which gives you the right to exclude others from making, using and selling your invention as claimed. "Patent Protection for Inventors" outlines steps to take to secure patent protection. Mailed promptly without obligation. Victor J. Evans & Co., Merlin M. Evans, Registered Patent Attorney, 942-G Merlin Building, Washington 6, D. C.

PATENT Services, $5, including patent copies. 48-hour air mail service. Invention protection forms free. Patent drawings prepared. Edward Abber, Warner Bldg., Washington 4, D. C.

INVENTORS—If you believe you have an invention, we can make a preliminary search on your invention and advise you whether we think it can be patented. Send for copy of our Patent Booklet "How to Protect Your Invention" and "Invention Record" form. No obligation. McMorrow, Berman & Davidson, Registered Patent Attorneys, 1438 Victor Building, Washington 1, D. C.

OBTAIN Patents yourself. Infallible instructions $1.00. Refunded if unsatisfied. Superior, 240 South Beverly, Beverly Hills, Calif.

"INVENTOR'S Guide" and "Record of Invention" free on request. Frank B. Ledermann, 154 Nassau Street, New York 38, New York.

PATENT Searches, $5.00, including patent copies. Same reliable search as conducted for patent attorneys. Free protection forms, prompt efficient service. Patent Service Institute, 945-B Pennsylvania Avenue, Washington 4, D.C.

CASH For your ideas. 280 Manufacturers need inventions, patented or unpatented. List free. Invention Bureau, 208-S Clinton, Oak Park, Illinois.

MAKE your invention pay. Mine paid over $750,000.00. My book tells what I learned hard way, inventors should know, avoid, save thousands, help you make fortune. Only $1.00. Free particulars, and "Invention Record" blank. Inventors Service, P.O. Box 5, Dept. S, Station B, Omaha, Nebraska.

SEARCHES—Put your patent searches in the hands of a Registered Patent Attorney or Agent as he qualifies to give a worthwhile patentability report. Record of invention form upon request and information on patent protection. Patrick D. Beavers, Registered Patent Attorney, 939 Columbian Bldg., Washington 1, D. C.

INVENTIONS sell easier with written description. Instructions 25c. Thomas Lehr, 17595 Strathmoor, Detroit 35, Mich.

CANADIAN Patent protection necessary! Reputable Attorneys listed, $1.00. Kennedy, 751 Kenaston, Montreal 16, Canada.

PATENT Searches $5.00. 48-hour airmail service. Patent Applications prepared. Invention protection forms free. Write Patent Engineering Service, 711 14th Street, N.W., Washington 5, D. C.

PATENT Searches, including copies of nearest patents, $5.00. Reports airmailed within 48 hours. Patent Applications prepared. More than 75 registered patent attorneys use my service. For free Record of Invention write Miss Ann Hastings, P.O. Box 176, Washington 4, D. C.

PATENT Searches $5.00. Reports airmailed in 48 hours. Patent Applications prepared. Free Record of Invention. Write Raymond L. Smith, Patent Searcher, 622 Sheraton Building, Washington 5, D. C.

61 INVENTIONS WANTED

INVENTIONS wanted. Patented; unpatented. Tremendous Manufacturers lists. Global Marketing Service, 1404 Mitchell, Oakland 1, Calif.

INVENTIONS promoted. Patented or Unpatented. Established 1911. Write Adam Fisher Company, 5418 Idaho, St. Louis, Mo.

INVENTORS: If your invention is adaptable to our business we will contract on cash or royalty. If not, we will try to place. Free booklet. Kessler Sales Corporation, 76A, Fremont, Ohio.

INVENTORS: Hundreds of manufacturers have requested our assistance in locating marketable new products. Complete information free. Institute of American Inventors, Dept. 30C, 631—E Street, N.W., Washington 4, D. C.

INVENTORS: We want good ideas in the machined products line. We are willing to finance patent rights in your name, develop, and manufacture acceptable ideas on a royalty or other mutually agreeable basis. Write today for further information. Hancock Mfg. Co., Inc., 1084 Martin Avenue, Santa Clara, Calif.

INVENTIONS Wanted. Patented or Patent Pending. 23 years experience Promoting Inventions. National Service Bureau, 3122 Meramec, St. Louis 18, Mo.

IF you have a marketable patent you want produced, write Box 232, Crawford, Nebraska.

PLANT with manufacturing and plating facilities looking for new items to manufacture and merchandise on royalty basis. Write to: Triplex Plating, Inc., Corymbo Avenue, Michigan City, Indiana.

INVENTORS Don't sell your invention Patented or Unpatented until you receive our offer, write Cowgill, Box 298, Marion, O.

CASH buyers for ideas and inventions. Write National Inventors Institute, 4097 East 131st Street, Cleveland 5, Ohio.

INVENTIONS Wanted. Patented, unpatented. Send for free form "R." Gilbert Adamec, Patent Broker, 3 Park Row, N.Y.

INVENTIONS Wanted. Patented. Pending only. Inventors Patent Exchange, Hartford 1, Conn.

64 MODELS, MODEL SUPPLIES

1954 CAR models. 1/25 scale, all metal, chrome trim. Send for catalog. Cars & Hobbies, Dept. PS-18, 2333 Haddon, Chicago.

BUILD Historic ships, vehicles. 50c to $9.00 kits. Illustrated Catalog 10c. Ideal Models, 19 West 18th Street, New York 11.

SHIP and other scale models. Most complete line in New England. Kits, fittings, plans, books, tools, engines, motors. Illustrated catalog 25c. James Bliss & Co., Inc., Dept. PS54, 342 Atlantic Ave., Boston 10, Mass.

SHIP and yacht model fittings; blueprints. Send 35c for illustrated catalog #29 listing hundreds of items. A. J. Fisher, 1002-2 Etowah Ave., Royal Oak, Michigan.

LIVE Steam Engine, 10½" high, ready-to-run, $5.95 postpaid. Catalog 35c. Merlo Company, 50-18 94th Street, Elmhurst 73, New York.

SEND 10c illustrated railroad catalog; HO.-O. and S. Selley, 746 Clay, Winter Park, Florida.

STEAM engines, boilers, castings. Catalog 25c. Anton Bohaboy, 2297 Price, Rahway, N. J.

SHIP Models Ltd. Kits, Fittings, Plans. Stuart-Turner Steam Engine Castings. 1954 Catalog 25c. Box 225, Andover, Mass.

65 HOME CRAFTSMAN

"TOPS" in everything for Leathercraft. Lowest prices. Genuine "Craftool" stamps. Catalog 10c. Crown Leather Company, 22 Spruce Street, New York 38.

LEATHER, tools, lacing, supplies. Free Catalog. National Handicraft, 199 William St., New York 7.

"PRACTICAL Painting, Wood Finishing" shows how to get professional results. Furniture finishing, workshop projects, home decorating. Complete Modern brush and spray methods. Tricks you've never seen. Write Home Craftsman, 115-F Worth St., N. Y. 13.

PLASTICS home-craft course for Men and Women. Tells and shows how to make hundreds of fast selling plastics products. All plastics and materials for 23 projects included in course. No special tools needed. Course pays for itself. Write for Free booklet. Interstate Training Service, Dept. D2-F, Portland 13, Oregon.

LEATHERCRAFT. Tremendous stock of leather, tools, supplies and kits. In leather business over forty years. Send 10c for big catalog. Sax Bros., 1111 No. 3rd, Dept. PS6, Milwaukee 3, Wisconsin.

LEATHERCRAFT, Metal Tooling, Textile Painting, Beadcraft, Shellcraft . . . many other crafts. Fun, easy, profitable! Free, big, illustrated catalog. Write today, Kit Kraft, Dept. 356, Hollywood 46, Calif.

MAKE your own! Assemble America's most beautiful aluminum door canopies and window awnings. The sides are preassembled. Save 50%—Factory to you. Free Measuring Chart & literature. Herbert's Aluminum Awnings, Dept. 2, 8974 St. Charles Road, St. Louis 14, Missouri.

LEATHERCRAFT . . . the quick, easy way to make extra money. No tools or experience needed with Larson easy-to-assemble Beginners Kits. Free Illustrated Instructions included. In Minutes, you'll be making belts, billfolds, handbags, gloves, moccasins, woolskin animals, etc. Amaze yourself and friends with your new skill as a leather craftsman! Send 10c Today for Big New Illustrated Catalog of ideas, kits, materials and supplies. Act Now! J. C. Larson Co., 820 S. Tripp, Dept. 4154, Chicago 24.

STYLECRAFT sure fire hits. "Pretraced" leather kits. Handbags, Billfolds, Filigree Belts, over fifty other projects. Patterns on leather. Why trace? Just carve, assemble and lace. Large assortment "Precarved" kits also available. Send 25c for catalog, free folder. Refunded first order. Apache Leather Company, 2804 E. Washington St., Phoenix, Arizona.

METAL—Rounds flats sheets. Small order inquiries invited. Will's Crafts Service —PS, Box 3922, Detroit 27, Michigan.

129 NEW full size Jigsaw Patterns. Unusual novelties, gifts, lawn figures up to 22 inches high, action (merry-go-round) windmill, toys, useful gadgets. Artist drawn. $1. Craftplans, 1321-B South Michigan, Chicago 5.

BABY Shoe Mountings. America's finest. Plated unbreakable metal and imported onyx. Bookends, ashtrays, desk sets, portrait stands. Low prices. Catalog free. Sentimetal, 253 E. Capital, Columbus 15, Ohio.

HAVE Fun, Make Money. 110 Jig-Saw Patterns. Trace, Cut, Paint. Unusual Animals, Shelves, etc. $1. Trans Plans, 35-22A 191 Street, Flushing, New York.

101 FULL size patterns. Smart new gifts, novelties, lawn figures, shelves, action windmills, alphabets. Plus "Make Money Jig Sawing" Only $1.00. Mastercraft, 65S, 7041 Olcott, Chicago 31, Illinois.

KNOCKDOWN Cedar Chest. Lumber and Veneers. Free Price List. Giles Co., Brownsboro, Alabama.

FREE! LeatherKraft Catalog Free! Write Box 397B (Use Little 2c postcard!) Tandy Leather, Tulsa, Oklahoma.

FILIGREE Cactus Wood. Ideal for beautiful moneymaking novelties. Two pieces $2.75. Spanish Spur Trading Post, Mesilla, New Mexico.

LAMP Size cypress knee nipple installed $2.00. Cy Products, Dept. 3J, Lafayette, La.

RARE Cholla cactus wood. Lamp size knee $2.00, straight $1.00. Rt. 9, Box 500, Tucson, Arizona.

COMPLETE plans for 6 foot sawbuck table and bench; with full size patterns, assembly drawings, and building procedure. 50c postpaid. Maxon Design Studio, P.O. Box 62-S, Stamford, Connecticut.

MAHOGANY ½"x5½"x36"—$1.50, ¾"x 7½"x36"—$3.00. Brent Wood Service, Box 2913, Brentwood 17, Missouri.

READY-cut Kits for Wallboxes, etc. Catalog 10c. David Tyson, Doylestown, Pa.

BUY wholesale nationally advertised power, hand tools, thousands other products at big discounts. Free "Wholesale Plan." American Buyers', 630-SS Linden, Buffalo 16, New York.

Copyrighted material

LEATHERCRAFTERS: Everything you Need. Catalog 10c. Arts Leather. 411 Joseph Ave., Rochester 5. N.Y.

MAKE Your Own Furniture! New 256-page book "How to Build and Repair Your Own Furniture" shows you how to save big money making and repairing tables, chairs, bookcases, desks, cabinets, shelves, much more! Step-by-step directions, hundreds of illustrations. Only $2.49—money-back guarantee. Popular Science. Dept. 654C, 353 Fourth Avenue, New York 10, N.Y.

SQUAREKNOTTERS: Make belts, handbags, lanyards, dog leashes, etc. Special offer! Beginner's book, catalog and quality cord samples 15c. P. C. Herwig Co., Dept. P41, 39 Henry St., Brooklyn 1, New York.

KNOCKDOWN cedar chest and lumber free price list. Bedford Lumber Company, Shelbyville, Tennessee.

LEATHERCRAFT Tools. Leather Embossing Plates. Craft Accessories. Dies. Catalogue 10c. Louis Jones Engineering Company, 1613 Main, Fort Worth, Texas.

NYLON Sanding Screen. Use both sides Last 10 times longer, wood-paint, metal, non-clogging, waterproof, 2/0 and finer 9"x11" size, 3 for $1.00 P.P.—wholesale catalog. Industrial Abrasives Co., 35 Monterey Lane, Sierra Madre, California.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The August issue closes on June 25. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 554, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

66 BUILD IT YOURSELF

CONSTRUCT 3 Bedroom Ranch House. Large rooms—Fireplace for $1475. Plans $1.00—Peter Alan, Box 8, Canarsie, N.Y.

MODERN kitchens for half. Specific illustrated data, all phases $2.00. Satisfaction guaranteed. Details Free. Stan, Box 91, Marengo, Wisconsin.

BUILD any size garden tractor. Write Allardco 1, Eland, Wisconsin.

REJUVENATE hearing aid, portable dry batteries. Simple charger plans $1.00. Pfeiffer, 4609 21 Avenue, Astoria 5, N. Y.

POWER Mower Kits, free plans, instructions, parts list. Temco Mowers, Springfield 2, Missouri.

BUILD a treasure and metal detector. Lightweight, Sensitive, Inexpensive. Complete kits. Free Literature. Dept. H. Electronic Applications, Box 4975, Washington 8, D. C.

WHOLESALE plumbing, heating supplies, free catalog. Aim, 316 South St., Philadelphia 47, Pa.

BUILD your own Power Mowers. Free literature. Klingsicks, Kingfisher, Okla.

DO-It-Yourself-Reynolds Aluminum, Libby Owens Fibre Glass, Firestone Foam Rubber. Save $$—Send 25c for Prices and Literature. Pacific Tool, Box 86S, Paramus, New Jersey.

WOODWORKING Supplies, glue, veneers, plywoods. Catalog Free! Minnesota Woodworkers Supply, Box 233, Hopkins, Minnesota.

GARDENS subirrigated, inexpensive materials plans $1.00. V. J. Lohus, Aloha, Oregon.

CLEVENGER'S cold bending ornamental iron instructions. Railings, furniture for shop training, welders, home owner's $2.00, sat. guaranteed. Clevenger, Box 1001, Santa Rosa, California.

BUILD permanent awnings, patios, jalousie porch, bathtub and shower enclosures. Aluminum prefabricated frames. Assemble yourself and save. Close-out prices. Russ Smith, 1555 Ridgewood, Cleveland 7, Ohio.

A 4 room house with bath $750.00. Designed for utmost in economy and beauty. Detailed building plans $1.00. Slyter-Homes, 49-PS West 44th, New York City 36.

BUILD inexpensive concrete blockmaker. Motor-Hand. Then make blocks for 5 room house for $95. Write, Clyde Lee, Mountain View 1, Oklahoma.

CABIN, cottage, hunting lodge, ranch house! Have any one with aid of amazing new book "How To Build Cabins & Ranch Houses"! 256 pages, 207 pictures, 17 different plans—any one worth more than 3 times the low cost of entire book! If not delighted return book for full refund. Send only $2.49 to Popular Science, Dept. 654C, 353 Fourth Avenue, New York 10, N.Y.

"CONCRETE Block Homes." 32-page booklet on how to build, $1.00. H. C. Lightfoot, Civil Engineer, Richboro, Pa.

ELECTROPLATE Baby Shoes. Hardware. Inexpensive process. Write Easyplater, Box 2939S, Red Lion, Pa.

BUILD three bedroom rancher—large rooms—fireplace—only $1200. Plans $1.00. L. Minkoff, Box 52, Flushing, New York.

"HI-Power" Slingshot Hunting Rifle. You make easily. Free Plans. Umako, P.O. Box 4133-D, Long Beach, California.

SAVE Money! Build water softening unit. Plans and instructions $1.00. Blueprint Service, Mt. Alton, Pa.

AIR Conditioner. Save $400.00! Build your own for home or automobile from junked refrigerator. Instruction Booklet—50c (specify whether for home or automobile). Slack, 3716A Belmont, Chicago 18, Illinois.

BUILDING Economies. 100 items save $1500.00—cost $1.00. Ken, Box 635, Island Pond, Vermont.

INFORMATION on Building Construction Problems. $1.00 per Question. Roth Tech., Box 2283, Youngstown, Ohio.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The August issue closes on June 25. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 554, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

67 OLD GOLD, JEWELRY, WATCHES, ETC.

JEWELRY making. Send 20c for illustrated catalog. Milady-Fair Co., G.P.O. 1328, New York City 1.

HIGHEST Cash Paid For Old Gold, Broken Jewelry, Gold Teeth, Watches, Diamonds, Silverware, Spectacles, Platinum. Free information. Satisfaction Guaranteed. Rose Refiners, Heyworth Bldg., Chicago 2.

FREE Sample pair of Earrings shows you how easy it is to make beautiful costume jewelry. Over 5000 styles listed in New Catalog—25c. Barry's, 179 Ardsley Court, Newark, New Jersey.

RHINESTONES, Jewelry Settings, Cameos Sequins, Beads, Hobby Kits. Send 10c for Illustrated Catalog. J & M Novelties, Dept. CG-4, Griffith, Indiana.

WATCH Repairing—Modernized Correspondence Course. Free information. WatcHealing Institute, Box 34715, Los Angeles 34.

CASH paid for Old Gold, Silver, etc. Satisfaction Guaranteed. L. Snyder, 351 West 34 Street, New York.

10 SWISS watches $18.00, catalog 10c. Berkowitz, 1150 Castlehill, New York 62.

68 TOBACCO & PIPES

PIPE Smokers! Cigar Smokers! Free illustrated catalog offers fabulous savings on choice imported and domestic pipes, cigars, tobaccos, supplies. Write Wally Frank, Dept. 2, 150 Nassau Street, New York 38, N. Y.

DOUBLE smoking satisfaction. Cigarette Connectors 30c. Anchor, 9550 Terry, Detroit 27.

69 FOR THE HOME

FOAM rubber furniture cushions—Factory seconds 50% discount, Free catalog. Perma-Foam, 140-A Main Street, East Orange, New Jersey.

TERMITES, save by making own Pentapak solution. Pentapak, Box 7111, Tulsa, Oklahoma.

NU-float toilet adjuster. Stops hissing—saves water $1.00. R. Whitney, 1215-A Summer Street, Stamford, Conn.

CESSPOOLS, septic tanks, outdoor toilets cleaned, deodorized. No pumping, digging or moving necessary. Inexpensive. Details. Chemical Cesspool Cleaning Co., Boston 34, Mass.

ALUMINUM Grilles—Beautifies protects—adjustable all Screen Doors. Free Pamphlet. Tamiami Gift Shops, 3309 - 14 St., Bradenton, Florida.

NEW, miracle product safely removes white rings, steam burns from all furniture. $1.00 bottle, includes mailing. Buff, Box 1714, Nokomis Station, Minneapolis, Minn.

LANDSCAPE your property, build trellises, arbors, gates, fences, garden screens, outdoor fireplace-barbecue, flagstone walks, beautiful garden furniture, a garden pool, much more! Amazing new "House & Grounds" book even shows how to add a breezeway-carport, terrace, porch or patio! 256 information-packed pages, over 700 pictures. Send only $2.49 to Popular Science, Dept. 654C, 353 Fourth Avenue, New York 10.

70 OF INTEREST TO WOMEN

ADDRESS Advertising Postcards. Must have good handwriting. Box Nine, Watertown, Mass.

BE Happy. Rich. Successful. Amazing Books $1.00—Samples 10c. Persil, 436 N.Y. Avenue, Brooklyn 25, New York.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay $3.50 lb. We paid Babbitt $4,165.00 in few weeks. Free Book. Washington Mushroom Ind., Dept. 181, 2954 Admiral Way, Seattle, Washington.

NEED Extra Cash? Get it selling Blair's. Our unusual line of household and food products. Every housewife a prospect. Products sent on Free Trial. Write Blair, Dept. 55MH-1, Lynchburg, Va.

DOLLARS from used Nylons. Make into lovely Flowers, Corsages. Sure sales with out sensational selling plan. Complete kit, details, $1.00. White Specialty Co., P.O. Box 5505, Cleveland 1, Ohio.

JAPANESE Doll. "Madam Butterfly" Hand Made 15" high. Beautiful Decorated Collectors Item $9.95. Postpaid. Remit International Money Order. M. Tsuji, Yoyogi P.O. Box 21, Tokyo, Japan.

71 FOR SALE MISCELLANEOUS

FREE 1954 catalog on government surplus bargains from country's largest surplus organization specializing in outdoor, sporting goods, clothing, camping equipment. Tents, rubber boats, tarpaulins, swim fins, hundreds of other items. Rockaway Sales Co., Box PS, Route 46, Rockaway, New Jersey.

NAMES, 1000 Men and Women Buyers, $1.00. Box 43, Oshkosh, Nebraska.

72 WANTED MISCELLANEOUS

SCRAP Mercury (Quicksilver) containers supplied. Tantalum—Bismuth—Tungsten. Metallurgical Products Co.—Established 1909, 35th & Moore Streets, Philadelphia 45, Pa.

OLD Toy Trick Banks. Gordon Grimes, 2000 Marber, Long Beach 15, California.

QUICKSILVER, Platinum, Silver, Diamonds, Prompt Payment. Mercury Terminal, Norwood, Massachusetts.

73 WEARING APPAREL

WORK clothes below wholesale cost. Quality cotton pants 89c, shirts 79c, coveralls $1.69 and shop coats $1.59. All clothes reconditioned, sterilized. We will ship anywhere, COD. Write Eastern Processing Co. Box C, Franklin Station, Baltimore 23, Md.

75 TATTOOING SUPPLIES

TATTOOING Course and Supply Brochures. 25c. Zeis School, 728 Lesley, Rockford, Illinois.

Copyrighted material

76 DRAWING SUPPLIES & EQUIPMENT

PERSPECTIVE simplified. You can draw anything quickly, accurately, using our 11x14 graphs. Set of four, instructions, $1.00. Domesticraft, Box 509, Westport, Conn.

77 TREASURE FINDERS

GOLD, Silver, Metal Detectors, Geiger Counters for Uranium, Mineralights. Sensational new fully guaranteed models. None Finer. Information Free. Detectron Corp., 5420 Vineland Ave., North Hollywood, California.

TREASURE Hunters! New 11-pound featherweight Model 101 locator for gold, silver and minerals. Money-back guarantee best available. Also Geiger Counters for uranium prospectors. Complete information free. The Goldak Company, 1540 W. Glenoaks Blvd., Glendale 1, Calif.

SELECTIVE metal and mineral detector. Revolutionary design. Distinguishes metals from black magnetic sands. Readily detects metals under salt water. Also Geiger Counters. Free literature. Gardiner Electronics Company, 2018 N. Dayton, Phoenix, Arizona.

TREASURE Trove Map—California, Nevada. $1.00. Refundable. 2922—164th, Flushing 58, New York.

LOCATE Hidden treasure, distinguish minerals from metals with Model 100 Detector. Weighs 5 pounds, extremely sensitive. Factory assembled ($79.90) or kit form ($39.90). Free Literature. Dept. G, Electronic Applications, Box 4975, Washington 8, D. C.

TREASURE—M-Scope Geiger Counters—Mineral Locators. Why buy something inferior when you can buy the best at a lower price? Backed by years of experience. Fully guaranteed by factory. Detects minerals, metals, gold, silver, coins. Payment plan available. Proven superior performance. Free 16 page illustrated booklet. Fisher Research Lab., Inc., Palo Alto, Calif.

78 WATCH REPAIRING

WATCH and clock repairing books for hobbyists. Free information. North American, Dept. 24-F, 2330 N. Milwaukee, Chicago 47, Illinois

WATCHMAKERS' Tools, Materials, Supplies, Watches. Catalog. Gales, Box 1000, Chicago 90, Illinois.

WATCHMAKERS! Beginners! Watches, Movements. Descriptive list. Box 150, Chicago 90, Illinois.

WATCHMAKERS' Journal for watchmakers, students, hobbyists. $1.00 year. Sample copy 20c. Box 3218, Daytona Beach, Florida.

79 MISCELLANEOUS

OUTDOOR Toilets, Cesspools, Septic Tanks cleaned, deodorized with amazing, safe, harmless powder. Easy, economical to use. Saves digging, pumping. 150,000 customers guarantee satisfaction. Details Free. Burson Laboratories, Dept. O-53, Chicago 22, Illinois.

HOME study for game warden, fish, park, forestry, wildlife and patrol service. Details free. Write Delmar Institute, A6, Whittier, California.

ADDRESS Advertising Postcards. Must have good handwriting. Box Nine, Watertown, Mass.

SWITCH off Radio, T.V., Lamps, etc. with remote control switch. Plugs into outlet 15' cord, $2.50. Variety Sales, Box 11533P, Los Angeles 48, California.

BIG interesting mails three months 25c, year $1.00. Harvey Teeple, Decatur, Ind.

NATURAL Dates, sundried figs, prunes. Raw Honey. Tontz's, Elsinore, Calif.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay $3.50 lb. We paid Babbitt $4,165.00 in few weeks. Free Book. Washington Mushroom Ind., Dept. 182, 2954 Admiral Way, Seattle, Washington.

A NEW home anyone can afford send $1.00 for folio. United Home Builders Associates, Box 1707 Nokomis Station, Minneapolis 17, Minn.

LETTERS reairmailed from Guam $1.00. Holdridge, Camp Asan, Sta. 8, Agana, Guam.

SIMPLIFIED analytics teach algebra quickly. I-A, 6123 Orchard, Dearborn, Michigan.

PERSONAL check protector. Pocket size. Bank approved. Easily used. Send $1.98. Winter, Box 128S, Media, Penna.

GENUINE sea horse inbedded in clear plastic $2.00. Richmond Enterprises, Box 1003, Augusta, Georgia.

SURPRISE Packets. Unusual, interesting. 12c stamps. Hilltop Specialty, Blackwood, New Jersey.

LEAKPROOF oilcan 4½" overall, 2" spout with drop dispensing control. Ideal for any small working mechanism. Guaranteed. $1.00 Postpaid. A.P. Sales, Box 137, New Rochelle, N.Y.

BUY Wholesale thousands nationally advertised products at big discount. Free "Wholesale Plan." American Buyers', 631-E Linden, Buffalo, New York.

RECEIVE Magazines, samples, catalogues. Mails from everywhere. Offers, hundreds. Get listed 25c. Rorick, Box 86-M, Cincinnati 26, Ohio.

COFFEE—Save 25c pound. Instructions 25c. Clifton's, 105 F Street, Ephrata 9, Washington.

EYEGLASS fogging by face perspiration and humidity eliminated. Chemical cloth 50c. Refundable. LoPrestu, R-2, Wharton, New Jersey.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The August issue closes on June 25. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 554, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

80 PERSONAL

DETECTIVE'S Opportunities. Detective particulars free. Write. Wagoner, P-125 West 86th, New York 24.

"HOW Can I Find Out?" You Can! Information confidentially developed. Any matter, person, problem. World-wide. Officially licensed. Established 1922. William Herman, 170 Broadway, New York.

BORROWING by Mail. Loans $50 to $600 to employed men and women. Easy, quick. Completely confidential. No endorsers. Repay in convenient monthly payments. Details free in plain envelope. Give occupation. State Finance Co., 323 Securities Bldg., Dept. S-14, Omaha 2, Nebraska.

RUPTURED? Something different. Light. Cool. No leg straps. No elastic. No pressure on hips or spine. Inexpensive. Worn by Mechanics, Farmers, Doctors, etc., everywhere. Guaranteed. Write Hand-Lock Products, Dept. P.S., Preston, Ont. Canada. Established 1893.

BORROW By Mail From Postal Finance Co. Employed Men and Women can easily obtain $50 to $600 Fast. Entirely By Mail. Repay in small monthly payments. Friends, relatives, employer, tradespeople will not know you are applying for loan. Advise occupation, amount wanted. Postal Finance Co., 200 Keeline Bldg., Dept. 13K, Omaha, Nebraska.

INCREDIBLE! Become Mental Superman Overnight! Free Booklet! Bijou, Box 1727-VL, Hollywood 28, California.

BUY vitamins direct. Amazing savings. Catalog free. Matoska, White Bear Lake, Minn.

IF you are nervous, write The Herbmaster, Forestville 8, Virginia.

ADDRESS Advertising Postcards. Must have good handwriting. Box Nine, Watertown, Mass.

SCOTLAND Remail, 4 letters $1. Gillespie, 45 Kirkland Street, Glasgow, Scotland.

MAKE money in spite of yourself! Infallible method! 6c brings proof. Hampton, 1738½ Silverlake, Los Angeles 26, Calif.

LETTERS remailed from any city 25c. Literature samples golden rules 30c. Persil, 436 N. Y. Avenue, Brooklyn 25, New York.

SURPRISE your Friends. Enclose dollar and we will send six beautiful postcards of London, England. You address them and return. We will remail them from London. Letters remailed 25c, airmail 50c. Send to M. Henri, 165 Southern Byepass, Oxford, England.

SAN Diego, California. Letter remailed 25c. 5 beautiful postals $1.00; remailed free. Sunday classifieds airmailed $1.00. Private address service $5.00 month. Your projects performed $2.00 up. Confidential Services, 1445S "B" Street.

RESURRECTION on earth—not heaven! Free. Write: Harvest, Jefferson City, Missouri.

INVESTIGATOR Training. Experience unnecessary. Many opportunities. Send for Free particulars. Free credentials. Exchange Secret Service System, 4360 Broadway, Chicago 13, Illinois.

PSORIASIS Victims: Hopeless? New Discovery! Free Trial offer. Write Pixacol, Box 3583-S, Cleveland, Ohio.

WEAR at our risk! Guaranteed wrist watch with expansion band. Free 5-day trial! If satisfied, $1 weekly—total $14. Floral Watch Co., Box 22, Glen Oaks, New York.

HAND Guide. Corrects your Penmanship in 10 hours. Write Perfect Penmanship, Box 665-35P, St. Louis, Missouri.

"X-RAY Mind." Dangerous power over others. (Details—10c). Krishnar Institute, 1912 Lincoln-Park-West, Dept. PX, Chicago 14.

REMAILING Switzerland, Liechtenstein 3 letters $1.00. Schmid, Hauptpostfach 255, Zurich, Switzerland.

HOLLYWOOD, Los Angeles. Letters Remailed 25c. Private receiving-Forwarding Address Available Scenic Postcards. Nationwide Worldwide remailing. Details 25c deductible. Michaels, Box 1924-B, Hollywood 28, California.

UNITED Nations, Remails 25c. Stoveken, 15 Rutan Place, Bloomfield, N. J.

CHICAGO Remails 25c, Forwarding confidential. Winslow, Suite 635, 4980 Marine Drive, Chicago.

LOS Angeles Remails 25c, forwarding confidential. Mercier, 835 So. Oxford, Los Angeles 5, Calif.

LETTERS remailed 25c each. J. Love, 1419 East 83rd Street, Los Angeles 1, Calif.

COEUR Dalene Postmark. Remail 25c, picture folder 25c extra. Jensen, 925 Garden, Coeur Dalene, Idaho.

MEXICAN Law, General Practice Attorney, 1203 Arizona Street, El Paso, Texas.

REMAILS one 30c, six $1.00. Conrad, Box 301, Seattle, Wash.

"INTERESTING Mails"—25c keeps your mail box full three months. Bentz Desk-J/70, Chatawa Mississippi.

YOUR letter postmarked San Francisco, New York City, Chicago, Milwaukee, Brooklyn, Miami, San Antonio, Reno, Los Angeles, Hollywood, or San Diego, 25c. Specify city and mailing date desired. Inquiries invited. Memo-Mart, Dept. 15, Box 3244, San Francisco, Calif.

UNITED Nations, New York, letters remailed 25c, five for $1.00. Lomnitz, 451, 15 Beekman, New York 38.

MONTREAL—Classifieds, remails, questions answered, $1.00 each airmailed. Kennedy, 751 Kenaston, Montreal 16, Canada.

DRUG Sundries Wholesale. Men, Women. Illustrated list 25c coin. P. P. Ally, 1123 Ellicott, Buffalo 9, N. Y.

DOLLARS in the mail for you! Put your ad here and watch orders fill your mailbox. For as little as $9.00 you can advertise your product or service in the classified opportunities columns of Popular Science Monthly. The August issue closes on June 25. Write today for order blank. O. K. Kelly, Classified Adv. Mgr., Dept. 554, Popular Science Monthly, 353 Fourth Ave., New York 10, N. Y.

Copyrighted material

Build your own Breeze . . .

SAVE UP TO 75%

ANYONE CAN ASSEMBLE WINDOW OR ATTIC FANS WITH

"BUILD YOUR BREEZE"

FAN KITS

Everything you need to assemble a quiet, efficient window or attic fan is included . . . No special tools or skill necessary . . . You SAVE up to 75%! Here's what you get: Fan Spider, Masonite Blades, Rubber-mounted Bearings, Shaft, Belt, Pulleys, Bolts and a famous EASI-BILD Pattern showing you how to assemble your own low cost cooling system in a matter of a few hours! All you furnish is Lumber and 1/4 HP Motor! There's a size for every need:

30" Cools average home, $15.95 P.P.
36" Size for large homes, $19.50 P.P.
24" Size for small homes, $14.95 P.P.
20" Apt. or office size, $13.95 P.P.

Send check or money order for immediate shipment postpaid on a money-back guarantee! Circular Free!

FAN KIT COMPANY, Box 5842-P, Memphis 4, Tenn.

A complete Spin Fishing Outfit, only $9.95!

GLASS SPINNING ROD *and* SPIN REEL

Positively **no backlash** with UNITED'S quality spin outfit. Offer includes a sturdy, featherweight aluminum reel, syncro meshed for smoothest performance. 3.22 gear ratio! Full bail pickup. Unbreakable spool (250 yd. capacity). **AND** a 6½-ft., 2 piece spinning rod, of precision taper-ground laminated glass fibre. Case included. Exclusive construction features assure championship performance. A **bargain** buy!

USE 10 DAYS. *If not satisfied return for refund. Cash orders prepaid. C.O.D.'s require $2.00 deposit.* **UNITED PRODUCTS, 9043 S. Western, Dept. RS-106. Chicago 20**

$9.95

Kruger Pistols *Wholesale!* $3.00 post paid

.12 CALIBER SINGLE SHOT

.14 MG. POWDER CHARGE

BLUE-BLACK FINISH .. KNURLED STYRENE STOCK

Crafted after famous German Luger design. Not an air or CO_2 gun. This is a small bore gun that actually shoots .12 caliber lead bullets fired by .14 mg. powder charge. Beautiful gun .. ideal for target shooting. 4" steel barrel. Overall length 8¾". This amazingly low price is due to small bore gun design, direct factory-to-you sales. Comes with 50 bullets. Send for extra bullets or available at stores. Money back if not satisfied. At dealers or Send $3 to

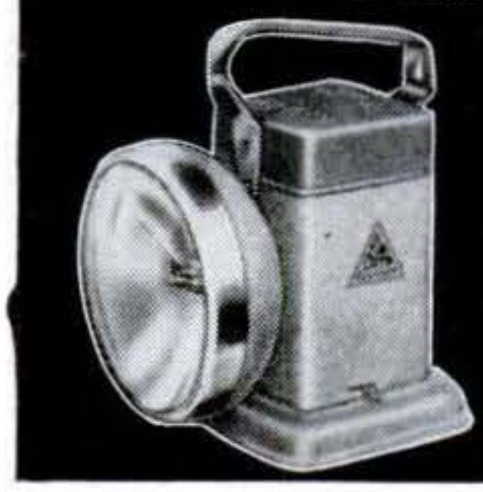
KRUGER CORPORATION
KRUGER BUILDING, BOX 51P, ALHAMBRA, CALIFORNIA
Send . . . Kruger pistols, $3 ea. $ . . . enclosed (No C.O.D.'s)
NAME . . . . . CITY . . . . . .
ADDRESS . . . . . STATE . . . .

LOOK—

A great value! Sturdy metal case. Rich two-tone green finish. Gold-color bright plated lens ring. Famous G. E. Sealed Beam unit. See your dealer . . . Get one!

DELTA ELECTRIC CO.
Marion, Indiana

A SEALED BEAM ELECTRIC LANTERN for only $5.50 less 6V battery



Delta-RAY SEALED BEAM Electric Lantern

ALSO Eshelman SPORT CARS

WORLD'S LOWEST PRICE

70 Miles Per Gal.

Holds 1 Adult

Free Literature.

ESHELMAN BOAT TRAILER

World's Lowest Price
Easy Load • Easy Haul
Easy Launch

ONLY $79

Write for Catalog

Top quality welded steel construction. Shipped complete with Hi-Speed wheels, tires, tubes, hitch, etc. Write

ESHELMAN CO., Dept. BT-96
119 Light St., Balto. 2, Md.; 333 N. Michigan Ave., Chicago 1, Ill.; 7070 Hollywood Blvd., Los Angeles 28, Cal.

NEW HOPE

in the battle against

CANCER

THE FIGHT against man's cruelest enemy is far from won. If present rates continue, 23 million living Americans will die of cancer—230,000 *this year*. And thousands of these will die needlessly—through cancer that could have been cured if treated in time.

ALL THE SAME, there have been victories. Thousands who once would have died are being saved—thanks, in part, to *your* donations to the American Cancer Society.

AND, LAST YEAR, the Society was able to allocate $5,000,000 of your donations to research aimed at finding the ultimate cure for *all* cancer. That's more money than ever before.

MUCH MORE, of course, remains to be done. So please make *this* year's gift a really *generous* one!

Cancer
MAN'S CRUELEST ENEMY
Strike back—Give

AMERICAN CANCER SOCIETY

Copyrighted material

NATIONAL FROGMAN CLUB

Join with famous skin divers, navy frogmen, deep sea divers, swimming champs, thousands of others in the NATIONAL FROGMAN CLUB. Learn the fun and thrill of exciting underwater adventure! Learn to swim under water—to spear fish. JOIN TODAY! Send name, address, age with $2 (in U.S. and Canada) or $3 foreign, for full year's dues. Get membership kit which includes: 1. Official membership card. 2. Official Club Emblem. 3. $1 merchandise check redeemable at Sea-Net dealers on Official National Frogman Club equipment. 4. Instruction book on "How to Swim Underwater" and "The Supreme Sport of Spearfishing." 5. Frogman decal for car or bicycle. 6. Catalog of Frogman Club equipment. 7. Periodic Frogman Club Bulletins with pictures, news of club, its members and our sport.

JOIN TODAY!
ONLY $2 in U.S. and Canada; $3 Foreign

NATIONAL FROGMAN CLUB
Dept. PS-64, 1428 S. Maple Ave.
Los Angeles 15, Calif.

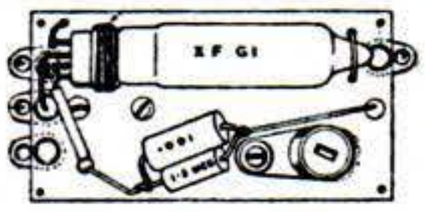
FINE BOWS and ARROWS
SELECTED RAW MATERIALS

Catalog 5c *Send for it*

HAND BOOK—Illustrated Instructions on Making and Shooting Archery Tackle—75c

L. E. STEMMLER CO.
Manorville (Box 1) L. I. N. Y.

RADIO CONTROL YOUR MODELS



"DELUXE MIDGET 1" RADIO CONTROL $9.98

"DELUXE MIDGET 1" RADIO CONTROL, CONSISTS OF LICENSE FREE BAND TRANSMITTING RADIO, A RECEIVING RADIO & A CONTROLLING ESCAPEMENT. LONG RANGE, TO OPERATE MODEL AIRCRAFT, BOAT, & AUTO MODELS. ALL THREE UNITS ABOVE SIMPLE ASSEMBLY WITH OUR PARTS & PLANS $9.98
DETAILED INFORMATION & RADIO CATALOG - 25c
SPECIAL "SUPPLY DIRECTORY" & SUPPLY COUPON, (coupon value $2.00) ONLY - - - - - - - - $1.00

RADIOMODELS, BOX 36, DEPT. P
BALTIMORE 6, MARYLAND

FIREARMS & SWORDS

You don't want to miss our new thrill-packed catalog. Fascinating background and illustrations of 1800 authentic pieces. Exceptional values in hard-to-find items. For your 175 page catalog #29 simply send 50c to cover postage and handling with your name and address.

ROBERT ABELS, Box PS, 860 Lexington Ave., New York 21, N. Y.

PLYWOOD BOAT KITS

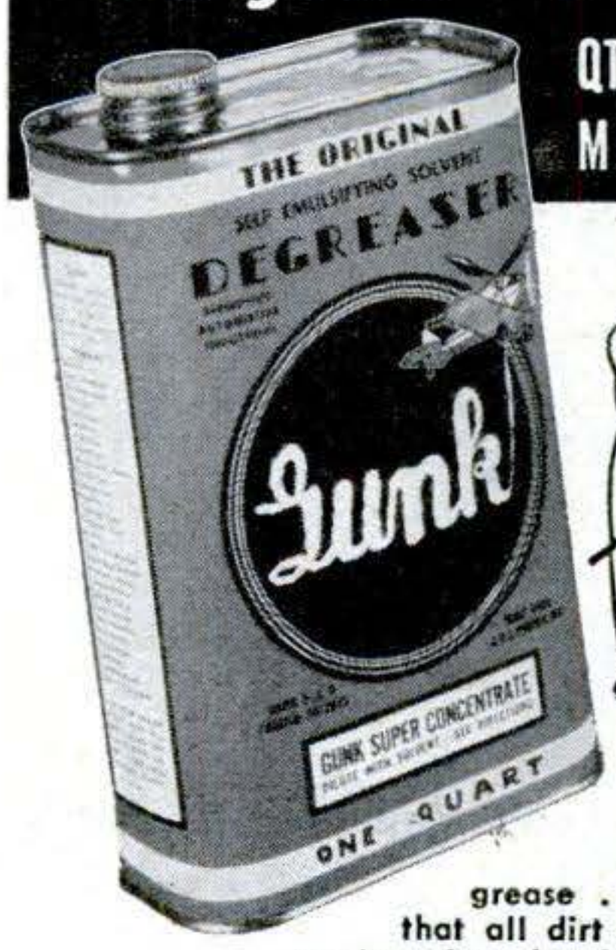
12 Ft. $97
14 Ft. $129
Freight Incl.

Send for free folders on all models as low as $39.00 *freight included*

TAFT MARINE WOODCRAFT
Dept. PS 636 39th Ave. N.E. Minneapolis 21, Minn.

DEGREASER!
engine shampoo

QT. SIZE CONCENTRATE
MAKES 2 GALLONS



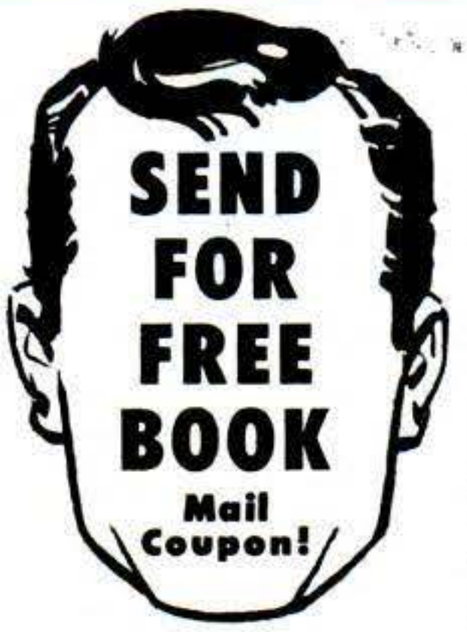
Takes cling out of oil and grease . . . emulsifies it . . . so that all dirt may be hosed off as easily as you rinse hands under water faucet.

Launders engines faster, more completely, and safer than steam cleaning (warm the engine). Self scouring action brings out factory new appearance . . . provides accurate visual inspection . . . Gunked engines run cooler.

Get Genuine Gunk in quart and larger sizes at better wholesale auto suppliers throughout the country . . . Flatly refuse imitations.

Extra strength, ready-to-use Gunk in pint containers is available from any of the Harley-Davidson Motorcycle Dealers everywhere.

The CURRAN CORPORATION, Lawrence, Mass.



Get "Headline Hints" from Hollywood by Patricia M. Stenz FREE!

Know the TRUTH about BALDNESS—FALLING HAIR—SCALP DISEASE

Most people have trouble with their hair. "Sick Hair" CAN'T LOOK GOOD, so, a leading medical clinic has been requested by the Patricia M. Stenz Clinic to study hair conditions. Now we know that there are SOME THINGS YOU CAN DO FOR YOURSELF!

Now...as acclaimed by thousands...a 5 to 7 weeks supply of the Stenz "HOME TREATMENT" is mailed to you in unbreakable bottles. DICK POWELL, star of screen, radio and television, said recently: "EVERYONE SHOULD KNOW ABOUT THE STENZ METHOD OF KEEPING HAIR VIGOROUS AND GOOD LOOKING." Mr. Powell knows that in Hollywood a good looking head of hair is a valuable asset!

MAIL COUPON FOR FREE INFORMATION ON CARE OF YOUR HAIR!

PATRICIA STENZ HAIR AND SCALP CLINIC
1493 N. Vine St., Hollywood 28, Calif.

Here's a straight-from-the-shoulder booklet about the hair and scalp, *and* a product which has been successfully used by thousands all over the world.

☐ Please forward FREE book.
☐ Mail "HOME TREATMENT" now. Enclosed is $15.00 plus $1.50 tax—$16.50 total for 5 to 7 weeks supply. (Postage prepaid.)
☐ Enclosed find $1.50. I shall pay C.O.D. fee for balance. (Calif. residents add 45¢ State Sales Tax)

Read the TRUTH FREE!

NAME _____
STREET _____
CITY _____ ZONE ____ STATE _____

Copyrighted material

Custom-Craft
THE ORIGINAL "PACKAGED"
BOAT KITS

SEND 25c for BIG 1954 CUSTOM-CRAFT CATALOG
See the world's finest, most complete line before you decide. Rated tops in design, styling and performance by the experts! Save over 50%! 41 New models! Easy to assemble! Mahogany parts, brass screws. $49.50 up! Catalog plus booklet "Boat Selection, Operation & Maintenance" $1.00 (Refunded on purchase). DEALERS INQUIRE!

ARMOR-GLASS
CUSTOM-CRAFT'S NEW SUPER XXX FIBREGLASS

Permanently leakproof your boat! End annual painting and calking forever. Easy to apply to any boat. Indestructible! Hundreds of other uses.
SEND 10c for detailed folder and "How-to-Measure Form." Send $1.00 for folder and measuring form PLUS two valuable booklets: "How-to-Use Armor-Glass" and "How-to-Build your own Fiberglas Boat or Auto Body." Dozens of other ideas!
PATCH and REPAIR KIT: $5 Includes generous supply of Fiberglas cloth, Super-XXX Resin PLUS plans for making Fiberglas tool or tackle box. Dozens of uses: Repairing, patching, etc. DEALER INQUIRIES INVITED.

Modern BOAT PLANS

With FULL-SIZE PAPER PATTERNS EASIER TO BUILD, SAVES TIME, MONEY
Over 150 modern plans and patterns with material lists and building procedure. Racing classes, cruisers, inboards, outboards, sailboats, 6 to 36 ft. All materials, fittings, etc. available at "Package" prices. Big savings! Design Catalog tells all!

SEND 35¢ for 1954 DESIGN CATALOG
Design Catalog PLUS boat building handbook, $1.00

CUSTOM-CRAFT • DEPT. 5 • BUFFALO 7, N. Y.

BENJAMIN SUPER CO_2 GAS CARBINE-$16.50

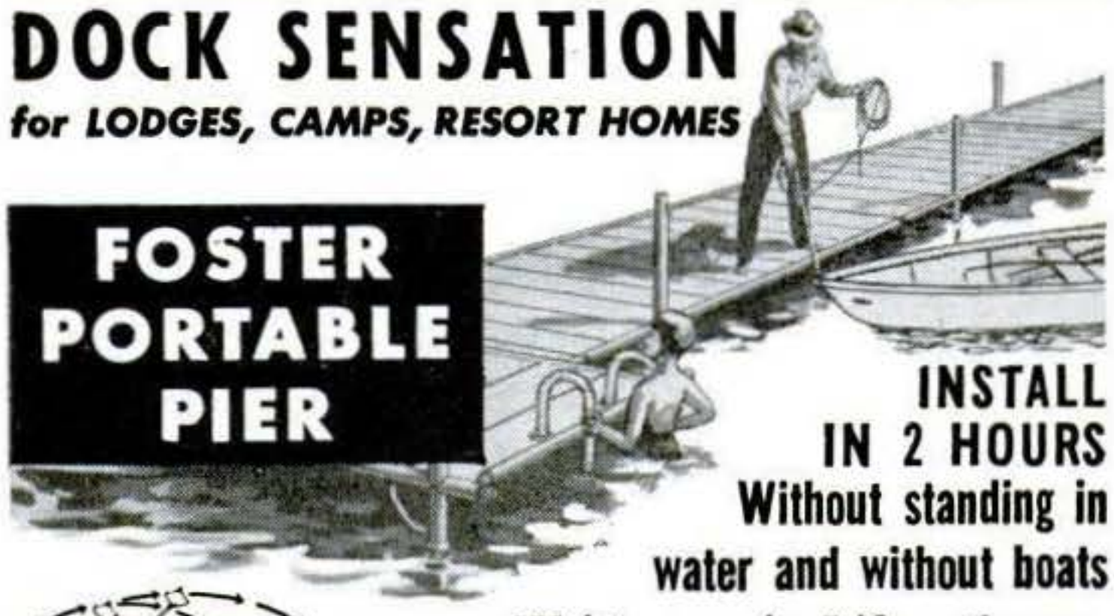
NEWEST TARGET RIFLE—22 IDEAL FOR SMALL GAME

ECONOMICAL
SAFE-NON-TOXIC
ACCURATE-CONVENIENT
PRACTICAL. Easy to operate—No spring recoil — No pumping. Uses low cost Soda Cartridges Cal. .22 Benjamin H-C Pellets and Darts.

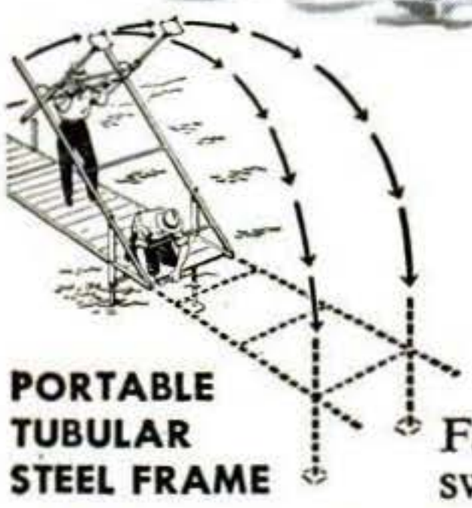
Benjamin CO_2 Gas Pistols Also Available

WRITE FOR FREE ILLUSTRATED FOLDER OF ALL MODELS
BENJAMIN AIR RIFLES AND BENJAMIN AIR PISTOLS
BENJAMIN AIR RIFLE CO.
852 MARION ST., ST. LOUIS 4, MO. U.S.A.

DOCK SENSATION
for LODGES, CAMPS, RESORT HOMES



INSTALL IN 2 HOURS
Without standing in water and without boats



PORTABLE TUBULAR STEEL FRAME

Written up in Life—the answer to all dock problems. Simply take it down each winter, reinstall each spring. Rustproofed—delivers ready to install complete with wood decking & jack for adjusting height.
Fast pivot assembly lets you swing each section into position.

At Dealer's or write for Bulletin -6 **Dealer Inquiries Invited!**

L B FOSTER CO. 231 S. LaSALLE ST. CHICAGO 4, ILL.

COMPLETE! READY-TO-USE BATTERY-OPERATED TELEPHONE SET

FULLY GUARANTEED
$3.50 POSTPAID
2 TELEPHONES 2 BATTERIES PLUS 100 FEET TELEPHONE WIRE

Not a toy! Professional quality—Operates up to 1 mile as clearly as your regular telephone.
Made of telephone black break-resistant polystyrene.
Perfect for construction gangs, farms, factories, offices, homes or any point-to-point communications.
No. 20A947 . Complete ....$3.50 Postpaid.

MERIBERT INC., 1012 McGEE ST., KANSAS CITY, MO.

DIALS LIKE A TELEPHONE

You're Right!
NOBODY LIKES TO ADD & SUBTRACT FRACTIONS
Get a Fractionator
"IT ADDS AND SUBTRACTS FRACTIONS"
$1.00 POSTPAID U.S.A.
Direct reading. Answers in Fractions & Decimal Equivalents. 100% Accurate. Handles all Engineering Fractions.
Direct Mail Only Refund if not Satisfied
Chas. E. Wells • Box 25-B • Montrose, Calif.

GIANT 100 POWER DAY & NIGHT
TELESCOPE

Steel and brass tubing construction. Ready to use. Two eyepieces. Instructions for use as a helioscope!! Extra heavy tripod. $7.95 fob factory. 400X telescope makers lens kit has brass focusing tube, erector, 5 lenses and instructions. $3.95 postpaid.

CARL W. JAMER, Dept. S5, MANORVILLE, N.Y.

Free Catalog of 3000 Novelties

Send for amazing catalog of novelties, live animals, scientific supplies, hobbies, funmakers, planes & boats, looms, magic tricks, joke articles, unusual seeds, gadget timesavers, cameras, optical goods, projectors, movies, lucky jewelry, religious novelties, disguises, musical instruments, stamps, coins, puzzles, fortune tellers, radios, auto & bike accessories, telescopes, magnifiers, compasses, banks, smokers' gadgets, artists' supplies, printing sets, engines, motors, shockers, knives, billfolds, fireworks, guns, rifles, sports, books, games, plants, etc. Send coin or stamp for postage.
JOHNSON SMITH & CO., Dept. 796 Detroit 7, Michigan

1954 GOERZ MINICORD
16MM FOCUSING REFLEX SYNCHRONIZED CAMERA
Newest, finest 16mm still camera . . . Minicord combines all advantages of the best minicams with many new advancements . . . Roof-prism focusing through 1.2 power telescope produces clear upright image; Goerz Helgor f/2 coated lens; automatic one-hand operation; magazine loading; 10 x 10mm picture on 16mm film gives splendid enlargements. Incomparable gift . . . At leading stores $84.50, incl. case. Write for interesting booklet S.
KING PHOTO IMPORT CO., 1133 Broadway, New York 10, N.Y.

NEW HULL AUTO COMPASSES ARE EASIEST TO INSTALL
• Greater accuracy and a patented, more positive means of compensating against magnetic interference have long kept Hull Auto Compasses first with America's motorists. Now, choice of a new vacuum cup mounting bracket with special adhesive, or the original clamp type, gives greater-than-ever ease of installation.
Write for local dealer's name, free literature

HULL MFG. CO. P.O. Box 246, E 6 WARREN, OHIO

Copyrighted material

GREATEST BARGAIN VALUES for America's Greatest Sport!

First Time At These Low Prices!

Every Single Part Made to Strict I.C.C. & Military Specifications

DIVING LUNGS

OPEN-CIRCUIT TYPE

$200 VALUE

89.50

APPROX. UNDERWATER TIME 1 HOUR

Complete Double Hose Assembly Included if Preferred . . $2 Extra.

Mine Safety Appliance Co. *Automatic Demand* Regulator* releases air or oxygen only as needed at a pressure identical to that of surrounding water. Heavy, forged, silver-soldered manifold connects 2 high-pressure tanks (295 cu. in. vol.; 22 cu. ft. press. cap.) fitted with easy acting shut-off valves. Exclusive adjustable steel cradle and harness hold tanks in correct position. A special shut-off valve at mouthpiece prevents water from entering hose. Unit is specially designed to stand upright for filling, testing, and storage. Same open-circuit type unit also with single tank for 59.95.

Complete with following accessories: 2" chrome test-gauge, wrench, and instructions.

DIVE-CRAFT, INC. • WILMERDING 5, PA.

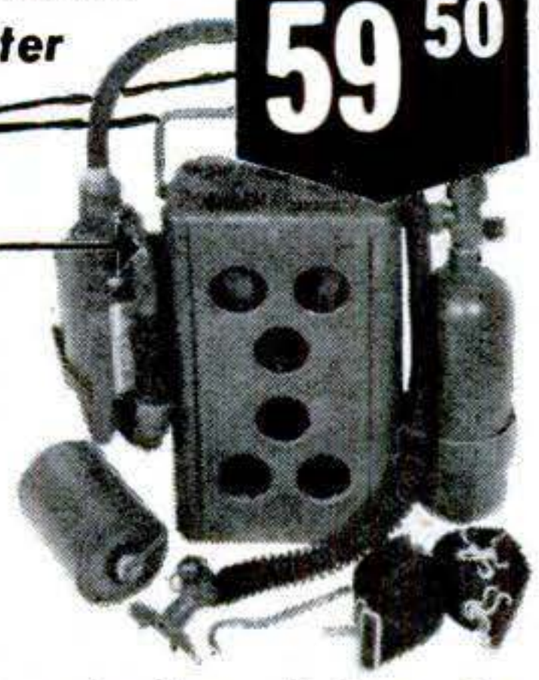
BOTH UNITS READY TO USE

BOTH UNITS COMPLETELY AUTOMATIC

No Underwater Adjustments

For Fresh or Salt Water

59.50



RE-BREATHER TYPE

One of the finest Oxygen Re-Breathing sets ever offered for shallow water diving (to 35 feet). Brand new U. S. Navy Surplus, made by Mine Safety Appliance Co. Complete with all accessories and instructions: 2500# pressure gauge (radium dial); nylon adjustable harness won't shrink or rot; quick release buckle; wrench; extra cannister. Unit is made of aluminum and non-ferrous alloys completely rust-proof. Baralyme Chemical type — amazingly economical automatic demand mechanism. 2 hours underwater time.

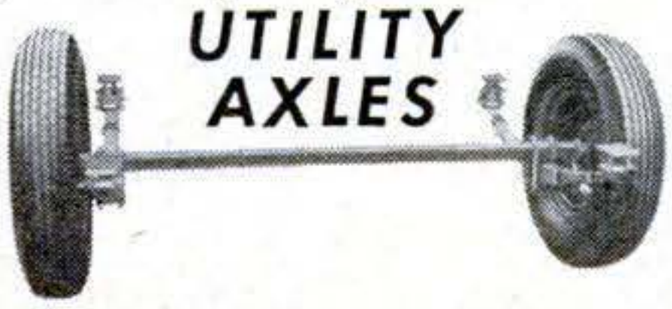
BUY NOW AT THIS SPECIAL SENSATIONAL OFFER

Send check or Money Order. If C.O.D., 25% with order. 10% deposit holds purchase.

FRAMED IN FAME—

Safety-Engineered

UTILITY AXLES



MODEL 1-UCO, shown, features 1½" square axle of solid steel; 2500 lb. capacity. Comes completely equipped, except for tires. List price $65.29, Fed. Ex. Tax included, F.O.B. Wausau. Other models to 5000 lb. capacity. We manufacture a complete line of trailer axles, couplers and jacks. Write for Brochure 14-FX

HAMMER BLOW TOOL CO.

"As old as the Industry!"

WAUSAU, WISCONSIN

G2

You Can Be a Manufacturer of Gardencrete

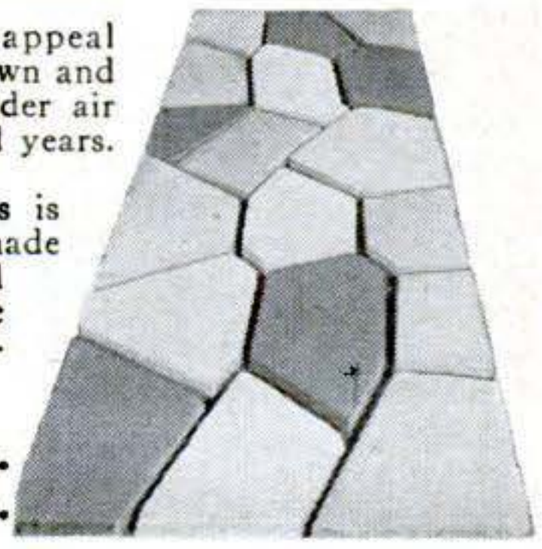
Set of 18 Flagstones (below). Sells for $8.25; Costs to make, $3.00. Your markup, $5.25.

Bird Baths
Jars and Vases
Flower Boxes
Flagstones
Lawn Seats

Your spare-time manufacture of Gardencrete can lead to a full-time business, with broad sales potentials and generous income possibilities, A small investment buys the Colorglazing machine and a few molds. Add more molds as your business continues to expand.

Gardencrete has wide sales appeal wherever people have pride of lawn and garden. Colors are fused on under air pressure. Stay put for years and years. Choice of 30 colors.

Your mark-up on basic costs is 200%—300%. Products easily made in shed or garage. We supply full instructions. Write for literature and information on costs and selling prices on complete line.



Colorcrete Industries, Inc.
711 Ottawa Ave., Holland, Mich.

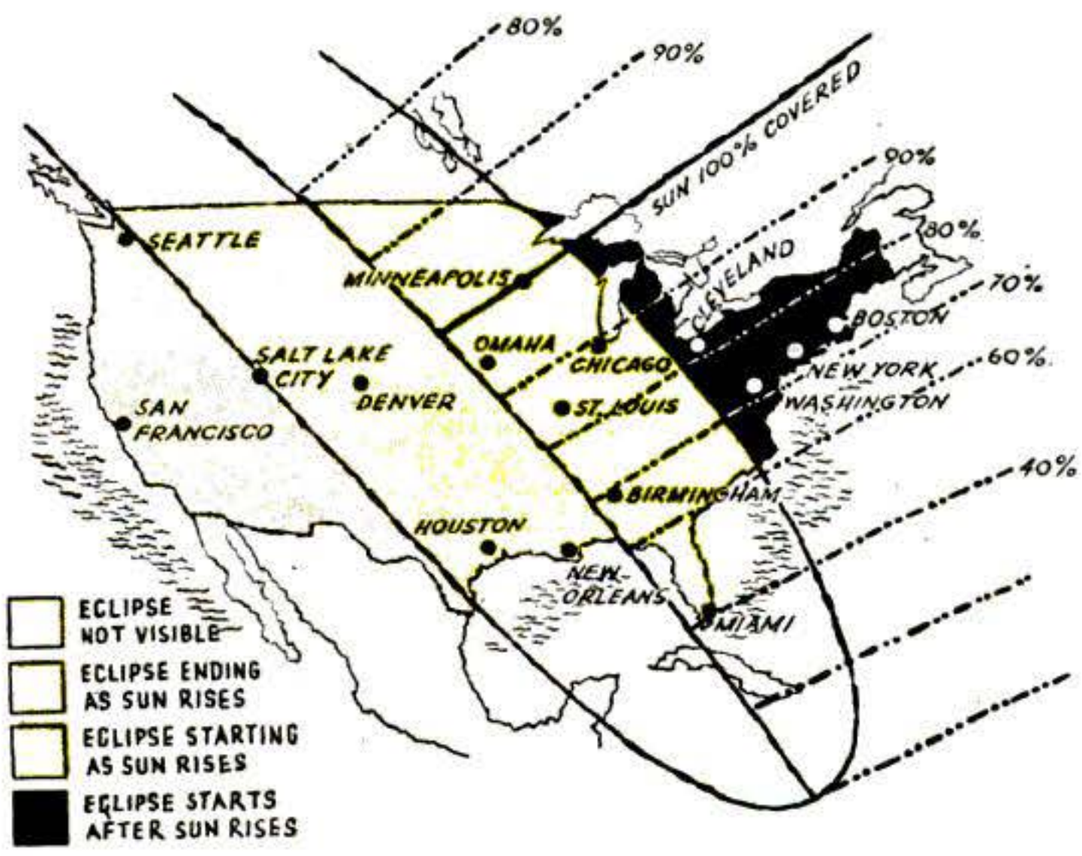
Copyrighted material

POPULAR SCIENCE MONTHLY'S . . . Last minute news & notes

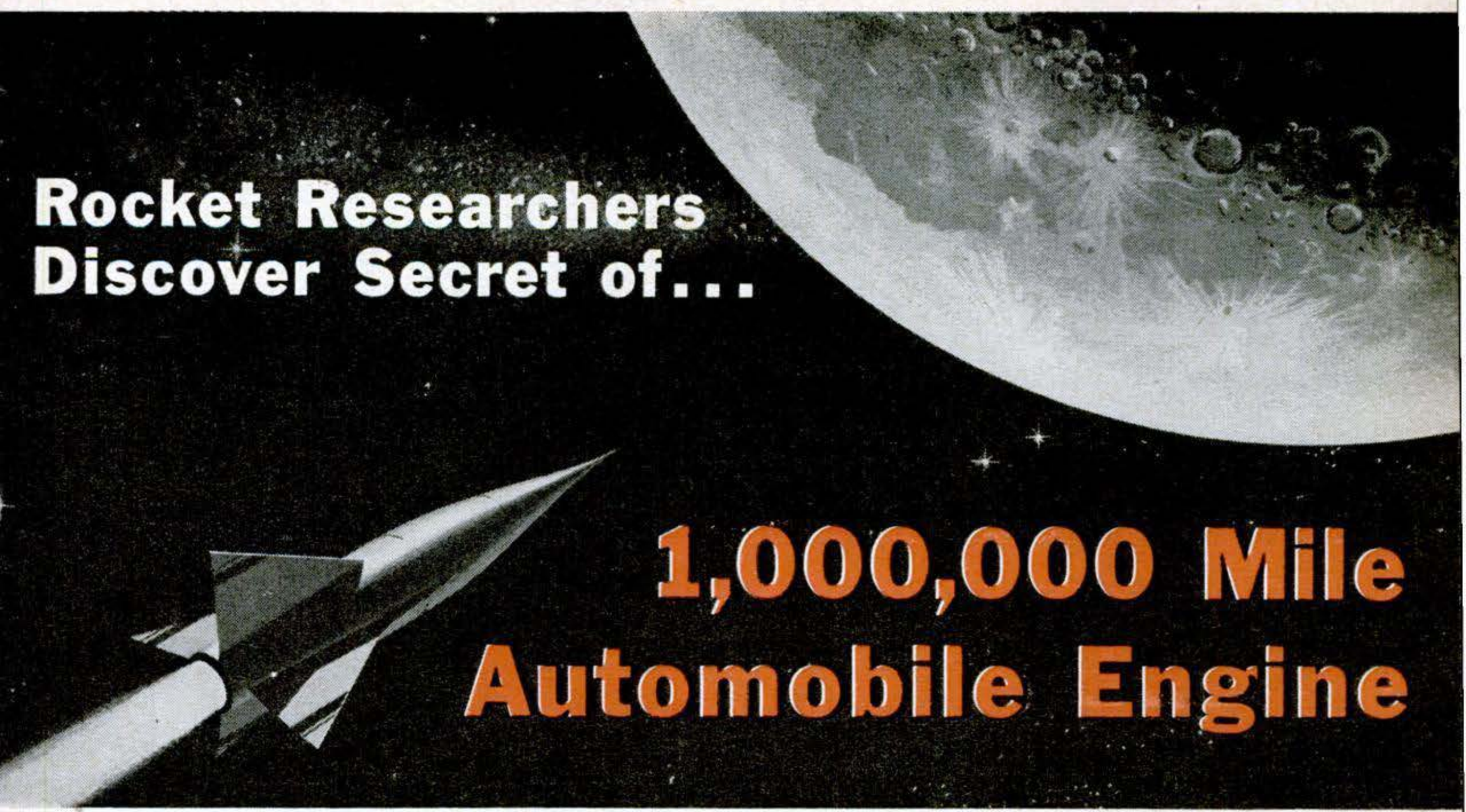
A BLUE AND YELLOW TWO-TONE CAR SHOULD BE SAFER TO DRIVE, it appears from research at UCLA. Certain colors make objects seem to be closer. The difference is as great as six feet--enough to avert an accident. Blue, it turns out, is most easily seen in daytime or fog, yellow best at night...The newest automatic elevator figures out how long to keep its doors open by counting the passengers entering or leaving (an electric eye does that) and adjusting to the flow of traffic. Westinghouse makes it.

JET PLANES THAT KILL WITH "NOISE" have been suggested by North American Aviation's chief engineer. He points out that the sonic boom--the explosion-like shock wave created by a supersonic plane--could do as much damage as a 140-m.p.h. hurricane...A new radio-controlled map automatically traces a pilot's route. If he flies out of the area covered by the map, the moving pen stops, but a special circuit remembers where he goes so the pen can start again at the right spot when he flies back onto the map. The device is made in Britain by Decca . . . The 213 students who took a televised course on Shakespeare (they stayed home but got college credit) did very well, reports their professor, Dr. Frank C. Baxter of the University of Southern California. They even scored a few more B's than campus students did.

YOU'LL GET A RARE VIEW OF AN ECLIPSE OF THE SUN June 30--if you get up early enough. Almost all of the U.S. east of the Rockies (see map) can see at least part of this awesome spectacle, but it will all be over by early morning. In Philadelphia, for example, this is the timetable: At 6:05 the moon will begin edging across the sun; by about seven it will obscure three-fourths of the sun and begin moving off; by 7:57 Old Sol will be shining full again. Minneapolis is the only American city to see the sun totally blacked out (around five a.m.) with day dramatically turned back into night. (A WORD OF CAUTION: To avoid eye injury, watch the eclipse through several thicknesses of completely blackened photo film. Sunglasses are not enough.)



Copyrighted material



Your Present Engine Can Last Years Longer . . . Thanks to New Sintered Bronze Filter Method!

THIS IS THE SECRET that wouldn't keep —the invention that may put men on the moon years before experts believed it could be done. This is the discovery that can make present-day automobile engines last hundreds of thousands of miles—and save millions of dollars for average car owners by reducing operating expenses. Yet, like many great discoveries, it is based on simple principles.

Friction, as every schoolboy knows, is what makes engines wear out. In early steam engines, this was such a minor problem that tallow was good enough for lubrication. Even in the first gasoline engines, almost any kind of oil could do the job.

But as engine heat increased and piston speeds approached 3000 feet per minute, lubrication engineers had to develop new oils containing "additives" you hear so much about.

Oil companies claim these additives are worth the extra 15c to 25c a quart you're paying for oil—and they're right. Purpose of these additives is to keep carbon and gum in harmless suspension in your oil—prevent deposits from forming in your engine. That's why your oil should look dark after a few miles of driving.

But here's the catch: the ordinary absorbent-type filter soaks up these valuable additives like a blotter. The more additives your oil filter soaks up, the "cleaner" your oil looks—and the more carbon, gum and varnish you may have forming in your engine.

Shocking? Yes, but that's only part of the story. Oil companies have developed still other additives—such as barium and molybdenum—which may make an engine overhaul something you don't even start thinking about

a four page report on the most important lubrication discovery in a lifetime!

Copyrighted material

until 250,000 miles or so. But there was no point in putting these oils on the market until an oil filter could be developed that would not remove additives. True, a few of these additives are already on the market in limited quantities—but, again, they are ineffective as long as they are being soaked up in absorbent filters.

The problem: find a filter that wouldn't soak up valuable additives, but would remove the microscopic abrasives that do the real damage to precision engine parts. These "danger zone" particles range from 10 to 30 microns in size (a micron is 39 millionths of an inch)—so small that several hundred of them would simply rattle around inside the period at the end of this sentence.

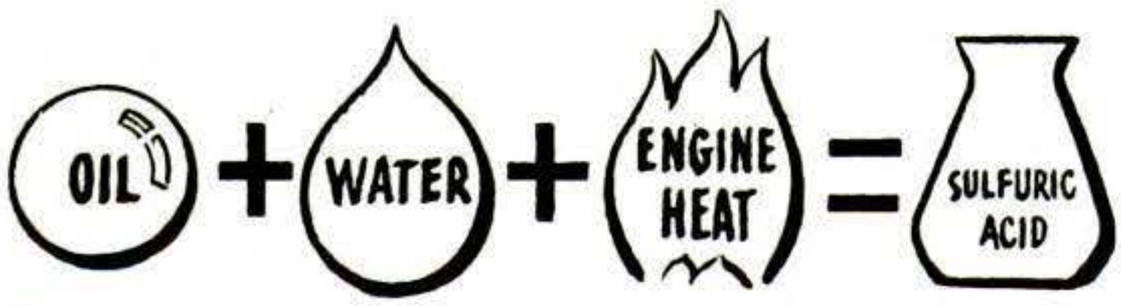
Since conventional absorbent filter material couldn't be packed tight enough to stop these tiny particles without reducing oil flow, engineers decided an entirely new kind of filter material had to be developed. Obviously, it had to be metal—but there was no way of making a metal screen fine enough.

Finally, metallurgists found the answer by fusing together millions of tiny bronze balls into a porous filter. Being non-absorbent, it wouldn't remove additives, yet abrasives simply couldn't get through the spaces between the tiny bronze balls. And, since bronze just doesn't wear out, it would *never have to be replaced!*

Tests Prove Life-time Filter Adds Years to Engine Life

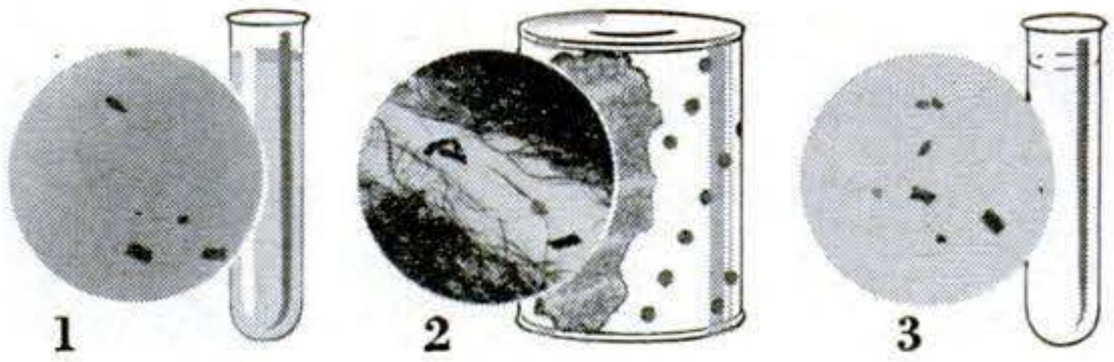
Samples were rushed to government proving centers for testing. Results: the Life-time bronze filter not only solved the critical problem of filtering liquid oxygen, nitrogen, etc., for guided missiles, but could save the government millions of dollars now spent on filter replacement packs for trucks, jeeps, tanks and other vehicles.

Besides government tests, millions of miles of road tests in truck, taxi and car rental fleets reveal amazing results. Cars equipped with the Life-time filter have already passed the 300,000-mile mark *without ever changing oil filters!*



By removing water from the oil, the Life-time filter prevents formation of sulfuric acid, deadly enemy of bearings, other precision engine parts.

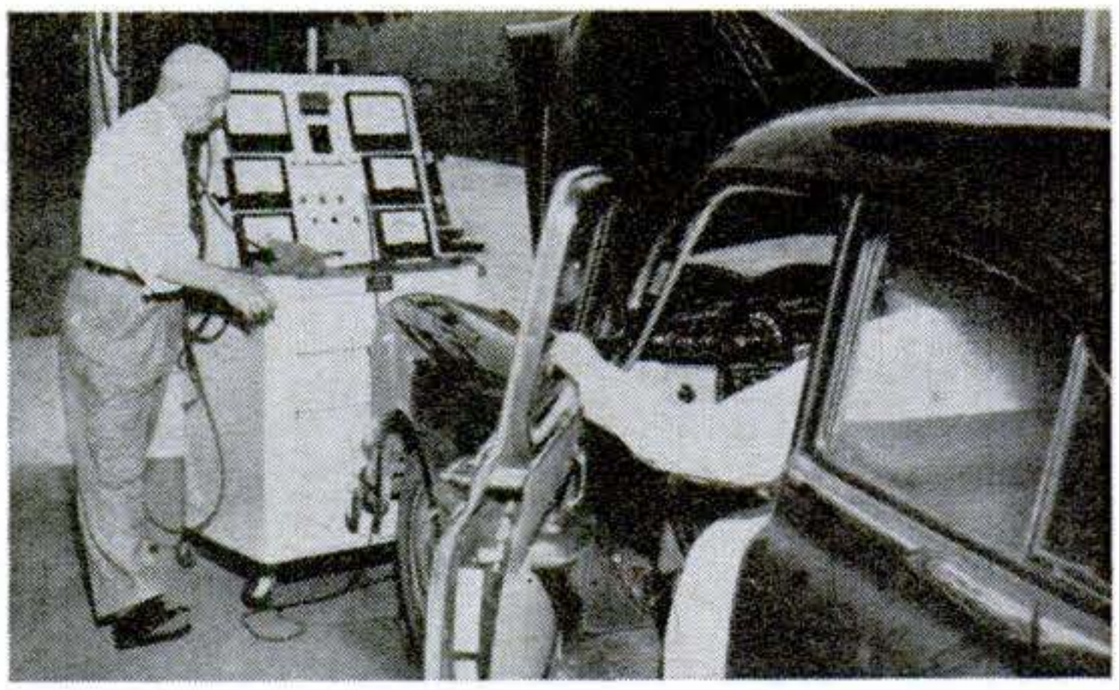
Micrographs Reveal How Ordinary Cloth or Paper Filters Let Abrasives Get Through



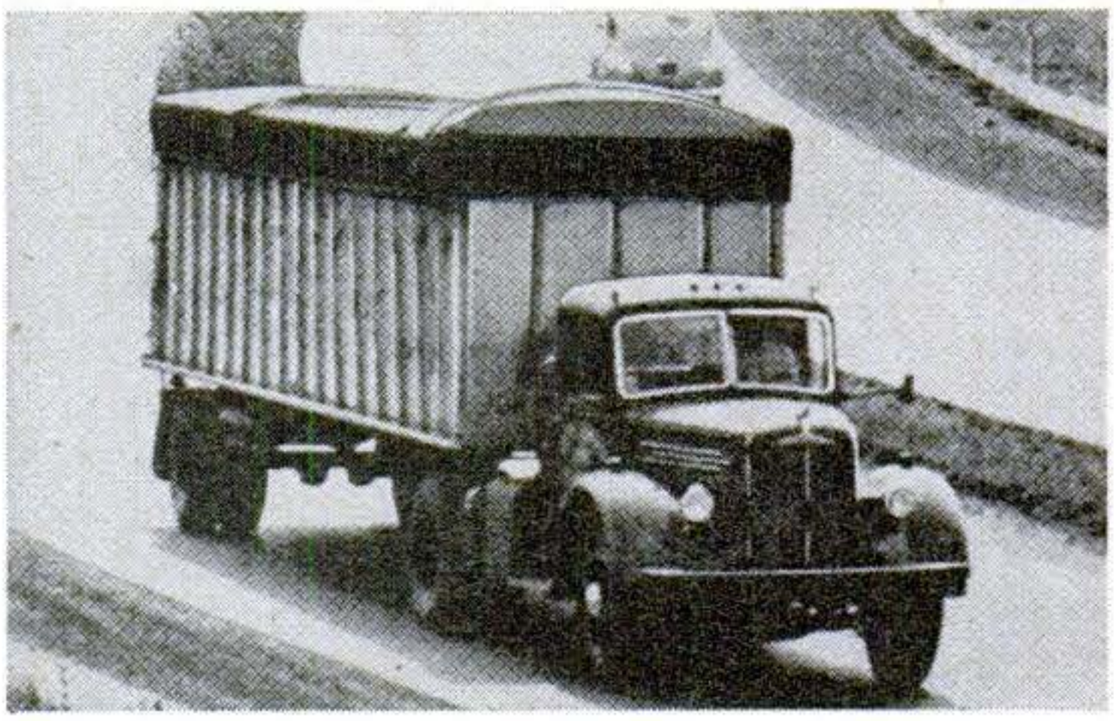
1. After 200 miles, unfiltered oil looks like this. Dark color is normal; it means detergent additives are keeping your engine clean. But abrasive particles are dangerous, should be filtered out.

2. Ordinary cloth or paper filters soak up additives, but let some abrasive particles get through when pressure forces "channels" in pack.

3. Because additives are removed, oil may look "clean" because carbon and gum are deposited in engine. Dangerous abrasives are still in oil.

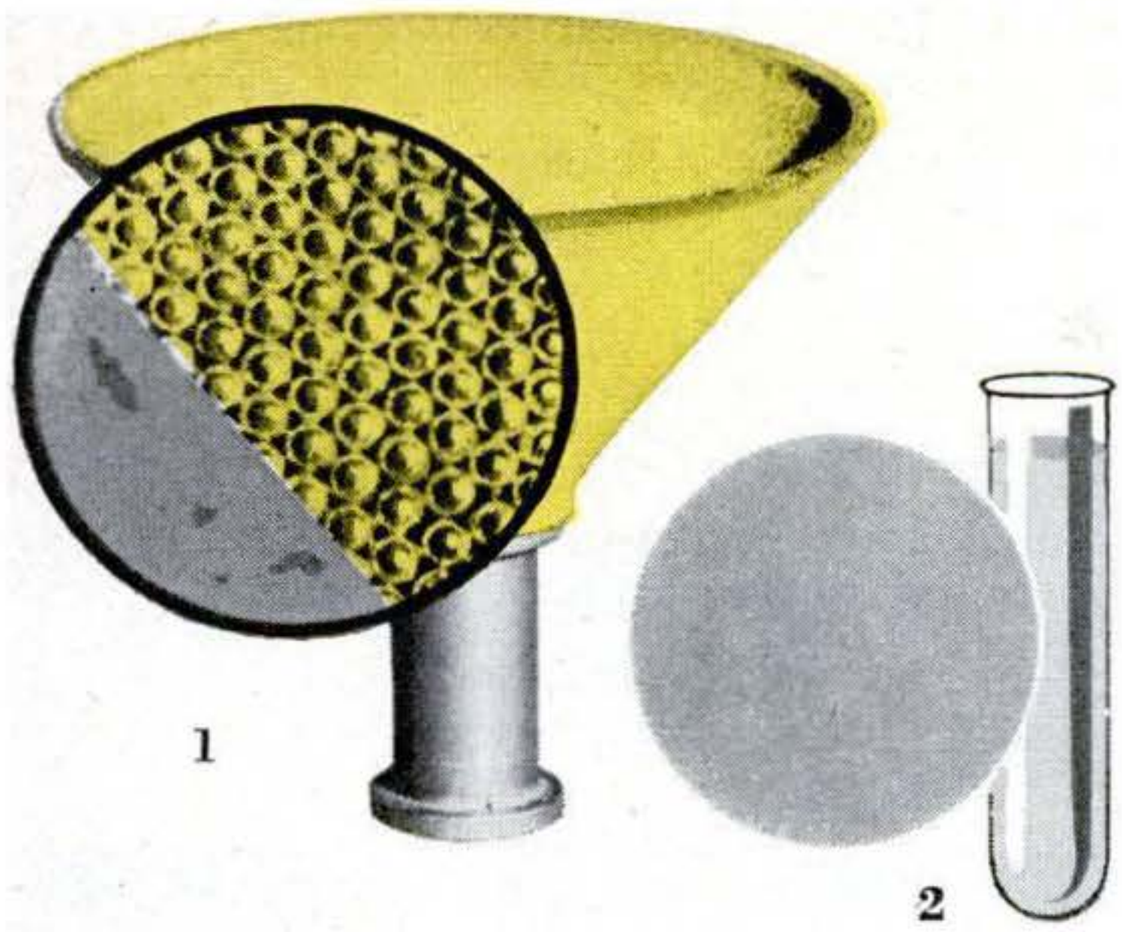


250,000 MILES before a major overhaul should be normal with today's engines and oils. The Life-time bronze filter meets modern requirements.



DIESEL AND GASOLINE truck fleets have proved value of Life-time bronze oil filter in hundreds of thousands of miles of road tests.

Copyrighted material



1. Since porous bronze can't "channel," abrasives can't get through—but valuable additives can, because Life-time filter is non-absorbent.

2. After 2,000 miles—or 10,000—oil is free of abrasives, but dark, proving engine is clean. Dark oil means a clean engine, just as dirty water means clean hands.

Life-time Oil Filter Never Wears Out - eliminates filter pack replacement forever!

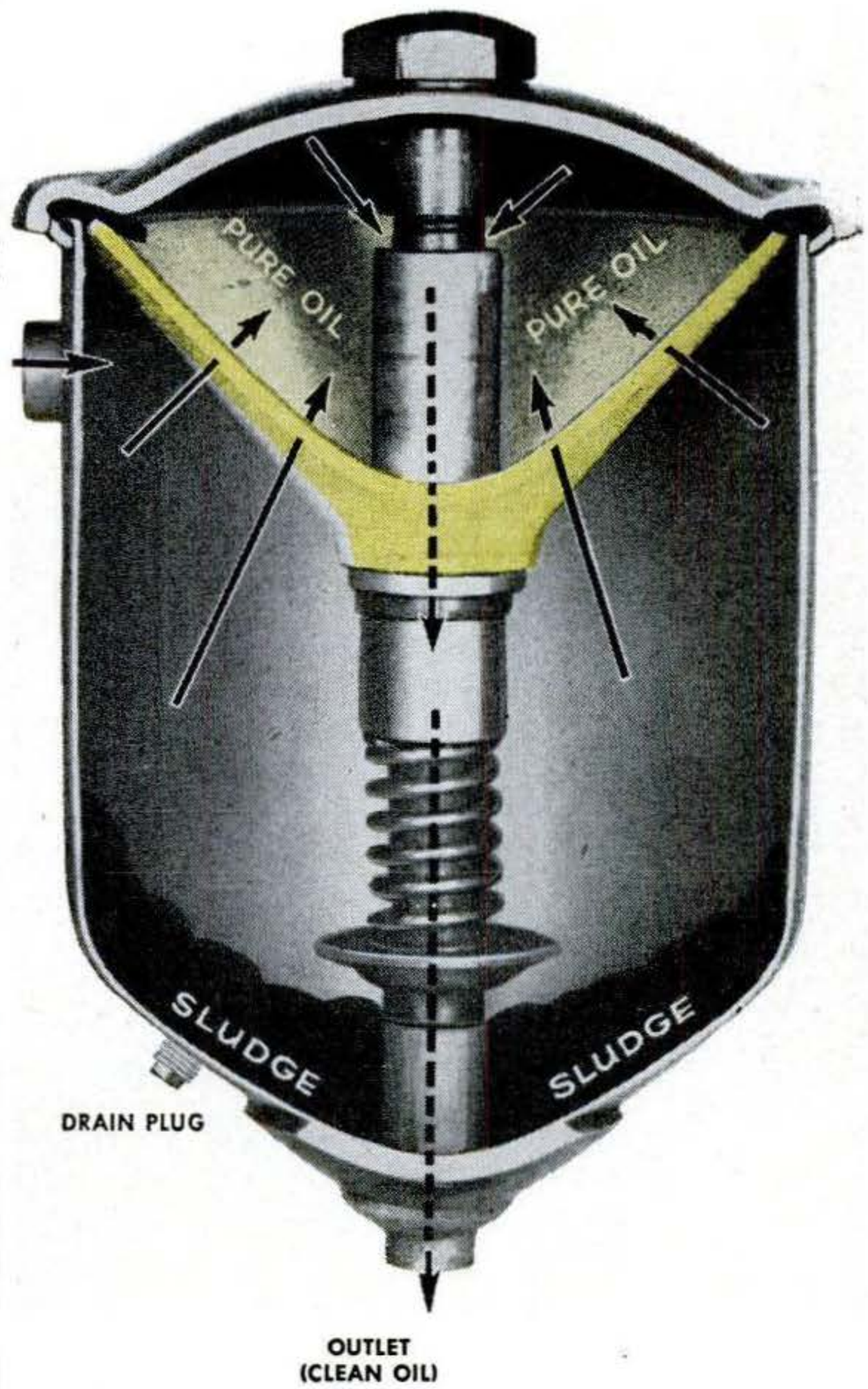
You never change the Life-time filter—just rinse it occasionally in gasoline and it's good as new. In addition, you save the quart of oil soaked up and thrown away regularly with ordinary replacement filter packs, which can add up to a lot of oil during the life of this filter. How long is that? Well, the Life-time filter is guaranteed for 10 years.

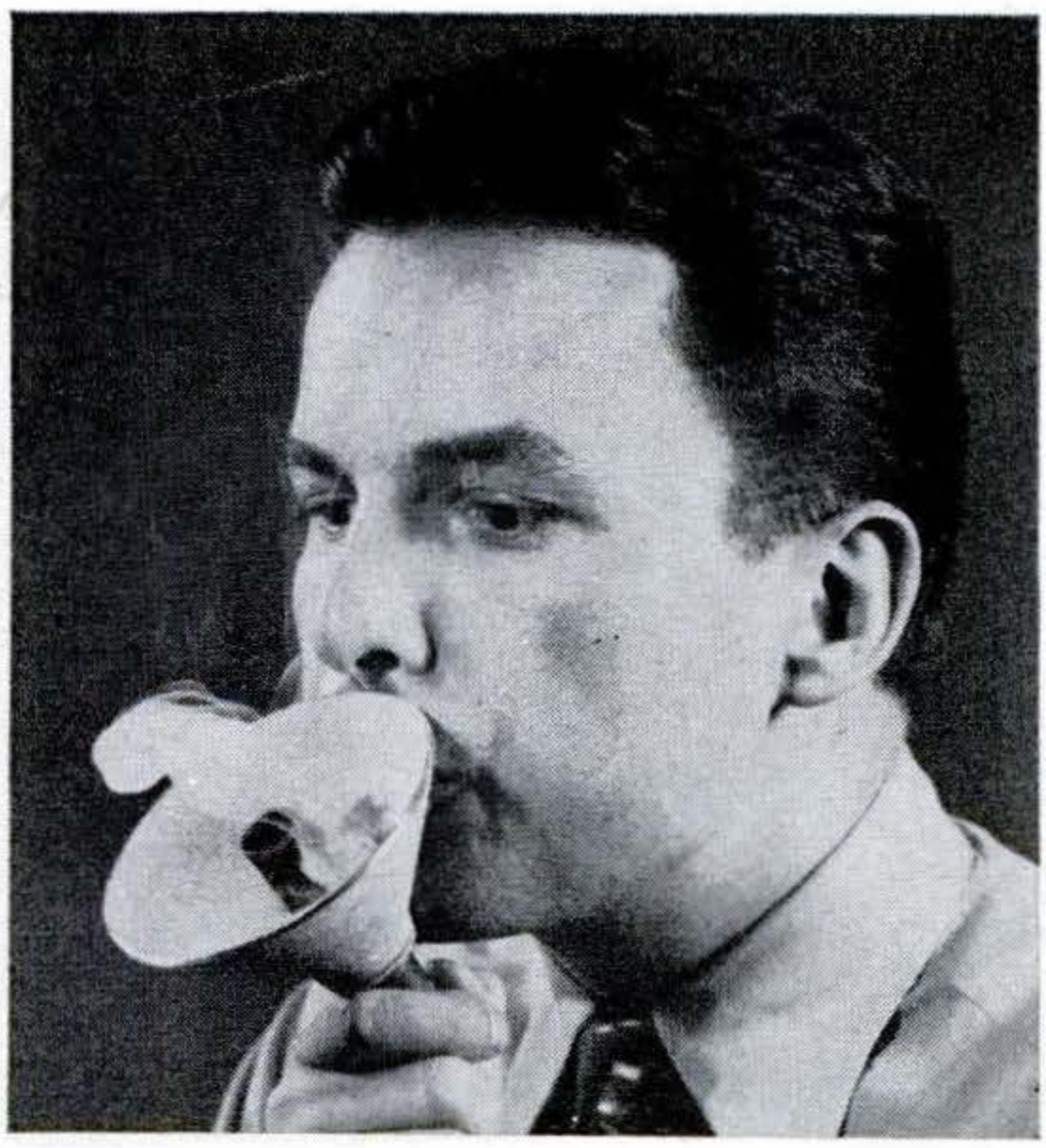
But since bronze simply never wears out, the amount of money you save on the filter packs you don't have to buy, plus what you save in engine overhauls, is something for your life insurance man to figure out for you.

To find out how you can have a permanent bronze Lifetime filter on your car, see next page.

How The *LIFE*-TIME Filter Works

As dirty oil is forced through element, all harmful particles drop to bottom of filter case. Only pure, filtered oil can get back into circulation.





"SMOKE TEST" proves superiority of Life-time porous bronze filter. Ordinary filters cause oil pressure to drop when fibers soak up oil, expand and prevent free circulation.

Copyrighted material

Try a Life-time Filter for 2 Weeks in Your Car or Truck

You can try a Life-time filter in your car for two weeks to see if it's really all we say it is (it is, and more). If, however, you decide you don't want to keep it because you miss the fun of buying filter packs, or for any reason, all you do is send it back for a refund, with no questions asked. Ordering is simple:

1. If your car already has an oil filter, you can convert it to a Life-time filter with a kit which replaces your throwaway pack with permanent bronze. Just send us the make and number of your present filter pack (if you know it); otherwise, send us the make, model and year of your car or truck. Enclose $6.95 (we pay shipping) or send $2.00 deposit (you pay balance and C.O.D. charges on arrival).

2. If your car has no filter now, or you want to replace the one you have, send us the make and model of your car and $12.95 (we pay shipping) or $5 deposit, balance C.O.D.

3. A few cars have full-flow filter systems; Life-time filter conversion kits for these are $13.95.

FREE INSTALLATION

Although you can install a Life-time filter yourself in 15 minutes, take it to your dealer if you like and we'll pay him for his trouble.

Use the order form below for immediate delivery—and do it today, before you waste another cent on filter pack replacements!

Permanent Filter Division, Dept. FPS-6
Continental Manufacturing Corp.
Washington Blvd. at Motor Ave.,
Culver City, California

Rush Life-time filter for:

Make, model, year of car_____

Present filter make and model (if known)

I enclose

- ☐ $6.95 for conversion kit (full flow, $13.95); factory pays shipping.
  - ☐ $2.00 deposit for conversion kit; send C.O.D.
- ☐ $12.95 for complete unit ($18.95 for chrome); factory pays shipping.
  - ☐ $5.00 deposit for complete unit; send C.O.D.

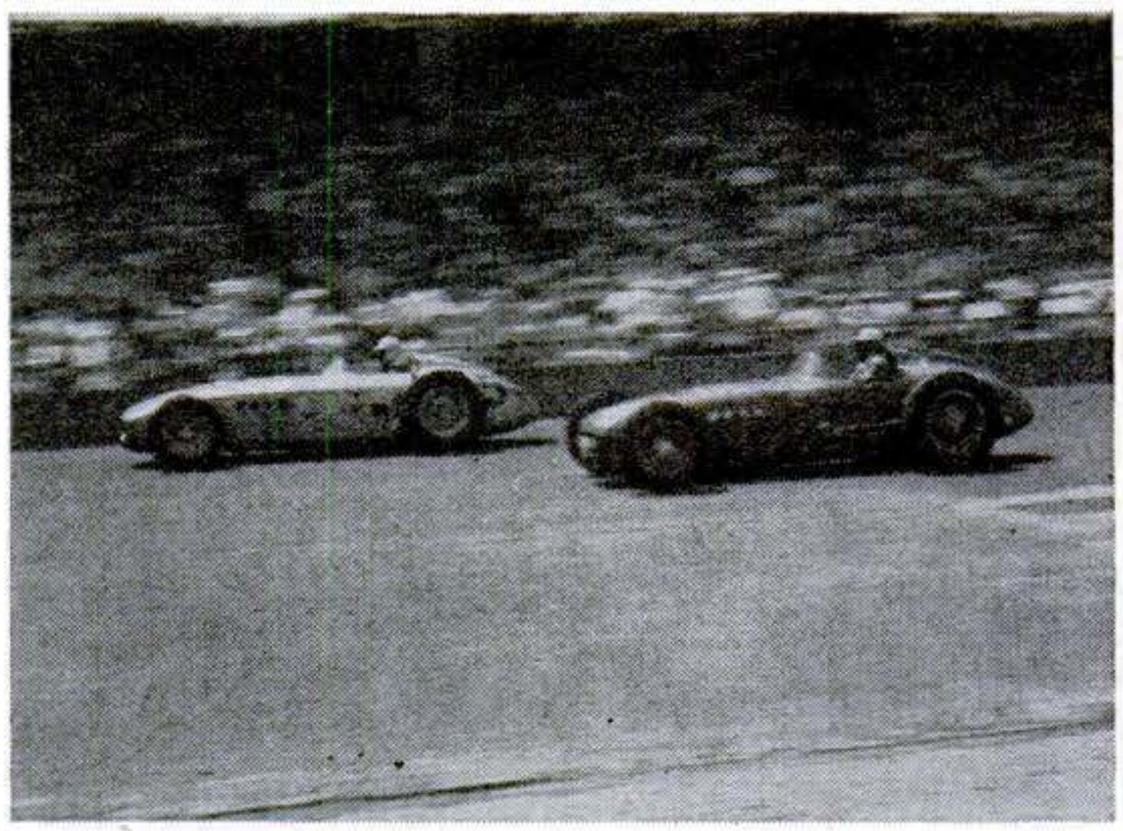
Name_____

Address_____

City_____ Zone_____ State_____

1. CONVERSION KIT replaces present filter element with Life-time bronze.

2. COMPLETE UNIT replaces entire old filter unit in 15 minutes.



INDIANAPOLIS "500", Panamerican Road Race, other international sports events are sponsored on network radio and TV broadcasts by Continental Manufacturing for Life-time filter.

Opportunities Now for Life-time Filter Dealers and Distributors

A dealer and distributor network is now being formed to handle demand generated by 4-page advertisements like this published in leading national magazines, plus sponsorship of radio and television broadcasts of the Indianapolis 500 and the Panamerican Road Race.

These valuable dealer and distributor franchises are not being sold; they are being awarded on the basis of ability to grow with us in the most ambitious expansion program in the industry.

For complete information on how you can be first with the most exciting automotive product of this decade, write or wire:

Continental Manufacturing Corporation
Dept. FPS-6, Washington Blvd. & Motor Ave.
Culver City, California

© 1954

Copyrighted material

POPULAR SCIENCE
REG. U. S. PAT. OFF. Monthly

"You Save Gas By Safe Driving"

A junior economy race teaches teen-agers the same tricks that win the big Sun Valley run.

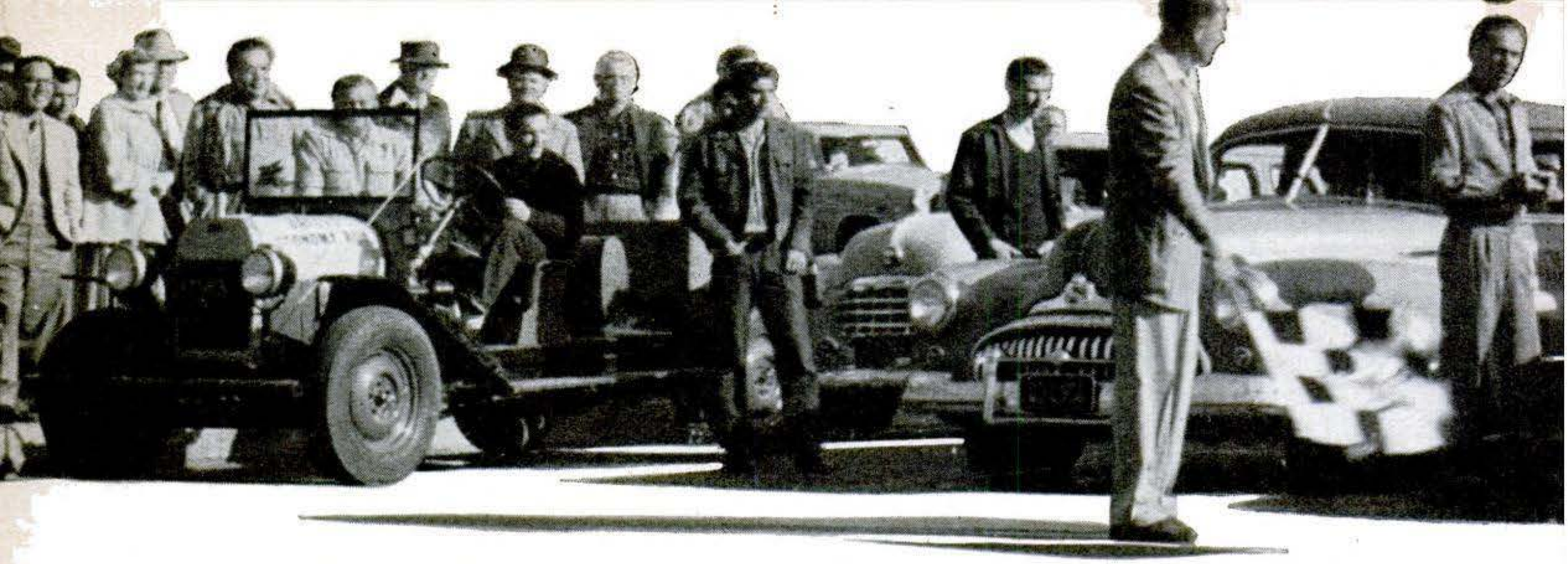
By Andrew R. Boone

THE idea that teen-agers are wild drivers dies hard. But in Stanislaus County, Calif., people now know better.

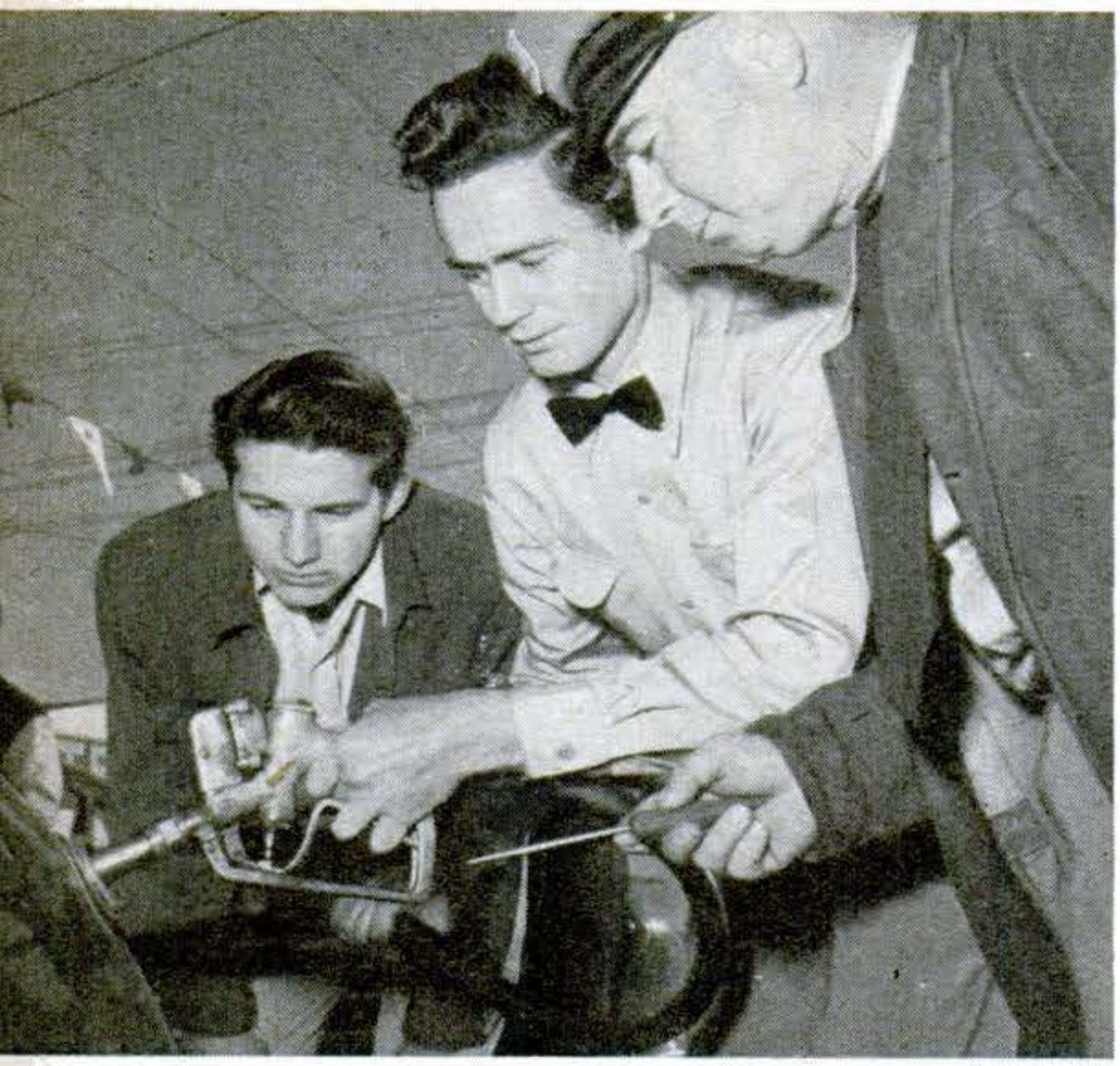
From nine high schools, 229 boys and girls set out recently in their own economy run. They drove cars ranging from jalopies to '54 sedans. Each drove a me-

WINNER OF THE HIGH-SCHOOL SWEEPSTAKES, Martin Marshall (left above), receives the grand award from Earl Campbell, regional director of the National Safety Council. Driving a '50 Studebaker, Marshall averaged 34.1935 miles per gallon. In ton-miles he achieved 57.4452—only a shade less than the winner's record mileage in this year's big Sun Valley Economy Run (page 84).

Copyrighted material



Everything from jalopies to 1954 models were entered in the contest. In Modesto, largest



DORWEN STINNETT, 17, watches as his car is gassed up. After the run, the tank was refilled up to the ice-pick mark scratched on by the official at right above.

FOUR BOYS lend their brawn to push a station wagon up to the starting line. As one car starts away, another one is pushed up. Cars are run off at one-minute intervals.

andering 106-mile course that included both country roads and city streets. A 3½-hour maximum time limit required reasonable average speed, and an observer in each car was ready to penalize infractions of the rules, such as light-jumping or coasting.

Martin Marshall, a 19-year-old high-school senior, took the sweepstakes cup by easing his '50 Studebaker around the course at an average of 34.1935 miles per gallon. His performance underlined the moral: You save gas by safe driving.

Marshall was tickled silly by his record. "It goes to show," he grinned, "that digging out really takes gas."

The story of this safety-economy run belongs equally to the young drivers and to the people who put it together. Most of the county got behind the run.

Investigator Starts Ball Rolling

You've got to give credit to Bela Clark first. Clark, chief juvenile investigator in the sheriff's office at Modesto, the county seat, has to handle youngsters who get into trouble on the highways. Not long ago he read of an economy run conducted in a single high school. Clark figured that if one was good, several would be better, and he dreamed of a big event that included every high school in his county.

Last winter Clark began to spark-plug his idea. He got the National Automobile Club and the General Petroleum Corporation to promise to lend expert help and to furnish some prizes. He canvassed

Copyrighted material

town on the route of the safety-economy run, the cars were lined up three abreast (above).

high schools, service clubs and police departments.

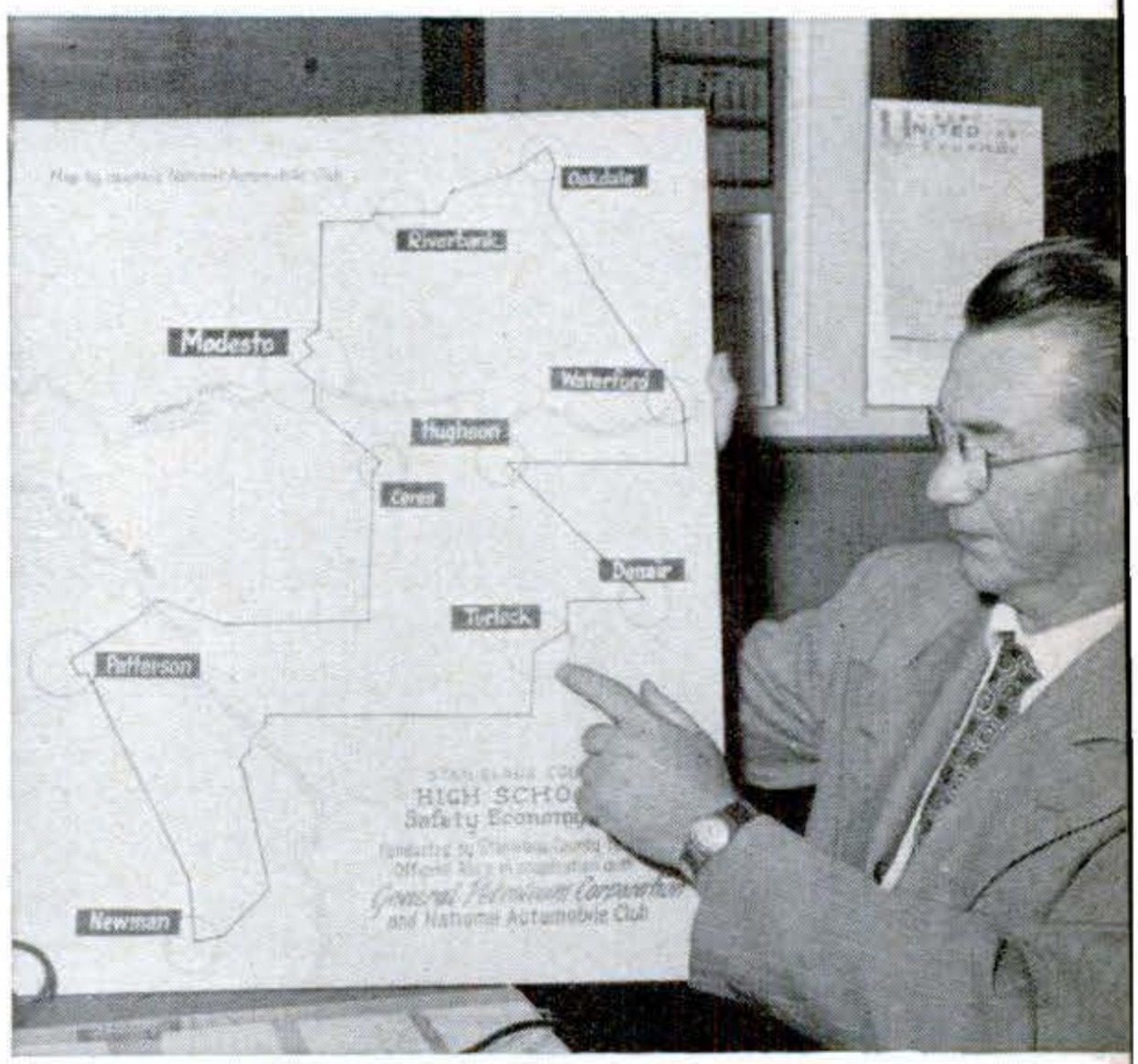
Rules patterned after the big Sun Valley run were drawn up. Driving licenses were a must. Cars had to be covered by liability insurance; and they had to be owned by the entrants or their parents—no borrowed jobs allowed. Except that dual stock mufflers were permitted, cars had to be strictly stock.

To level out the differences between cars and put the biggest emphasis possible on driving skill, the ton-mile formula was used. In this computation the total weight of car and occupants in tons is multiplied by the mileage covered, and divided by the exact amount of fuel consumed.

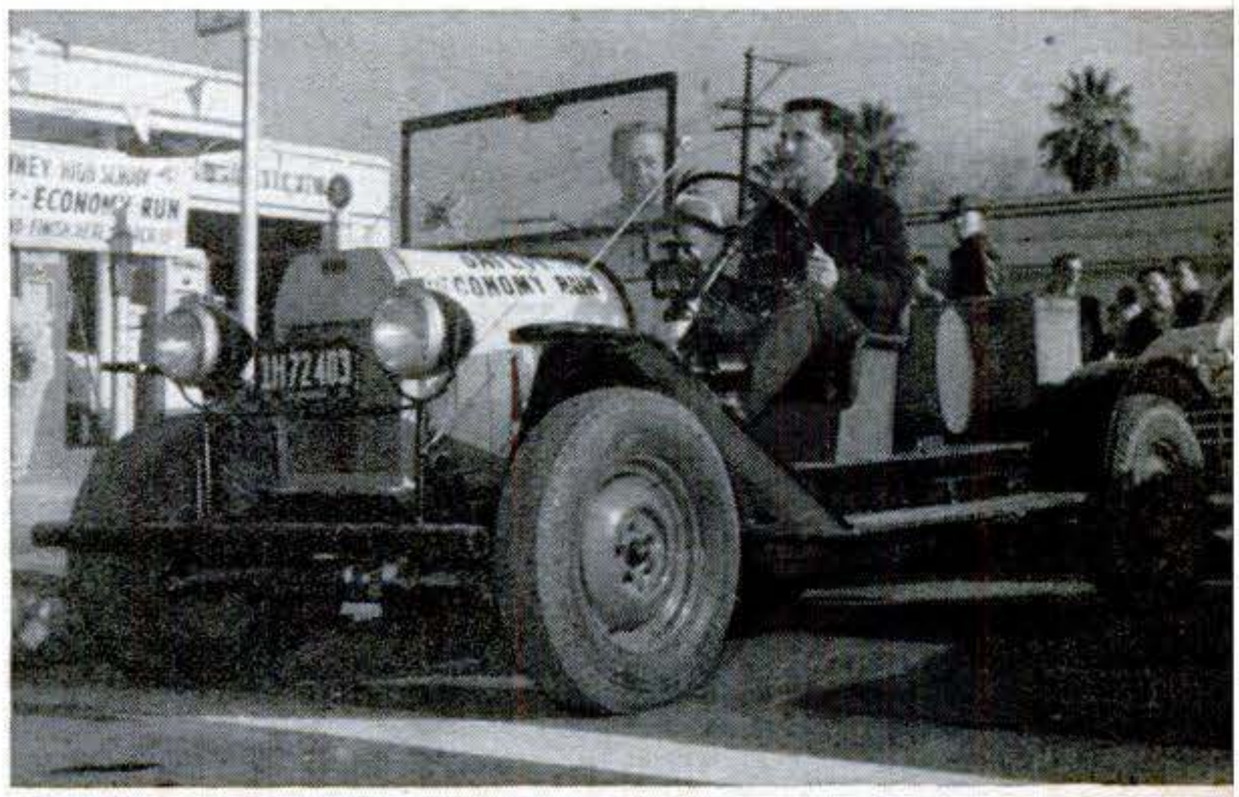
An observer in each car—not a relative—rode with each youngster to note any rule violations on a signed report. Penalties for declutching with the car in motion (other than in normal shifting), for coasting in neutral, for jumping red lights or stop signs, and for failure to use hand signals were assessed for each infraction at the rate of a tenth of a gallon of gas added to actual consumption. Taking a short cut, getting a police warning, adding fuel, or exceeding the time limit brought disqualification.

Racers Get Out Early

At seven in the morning on the day of the run, all 229 entrants presented themselves at nine starting and finishing points around the course. Papers were checked, cars filled up with gas to a



MAP SHOWS the 106-mile course and the location of nine of the high schools that participated in the contest. Bela Clark (above), juvenile investigator, spearheaded the event.



ONE OF THE SMALLEST CARS in the run was this copy of a Stutz Bearcat. Entered by Randall Smith, a 16-year-old junior, the car has a '39 Willys motor and chassis.

Copyrighted material

Studebakers Sweep Big Economy Run, Set New Mileage Mark

EQUIPPED with a standard transmission and overdrive, a Studebaker V-8 Land Cruiser averaged a record 60 ton-miles per gallon to win the top award in the 1954 Mobilgas Economy Run. Said driver Dick Griffith of Temple City, Calif., "We tuned that engine to a gnat's eyebrow, and I imagined I had an unbroken egg under the accelerator."

Studebakers won in all three classes in which they were entered in the 1,335-mile marathon, which involved 188 miles of city traffic and 24 miles with tire chains. A Dodge V-8 placed a close second in the over-all contest.

MAKE & MODEL	DRIVER	MILES PER GAL.	TON-MI. PER GAL.
LOW PRICE (Standard Trans. & Overdrive)			
Studebaker Champion	Dick Johnson	29.5806	56.5138
Ford 6	Les Viland	26.1479	55.5773
Ford V-8	Bill Hooks	23.3884	50.7528
Plymouth	Le Roy Schlick	22.4397	47.7067
Chevrolet	Pete Novotny	22.3167	46.9655
LOW PRICE (Automatic Trans.)			
Hudson Jet-Liner	Lee Hamer	21.6382	43.1249
LOW MEDIUM (Standard Trans. & Overdrive)			
Dodge Royal V-8	Danny Eames	25.3973	58.0456
Mercury	Bill Stroppe	21.4781	49.9795
LOW MEDIUM (Automatic Trans.)			
Oldsmobile Super 88	Willard McCarthy	19.7506	49.7122
Dodge Royal V-8	Art Rene	21.3511	48.5951
UPPER MEDIUM (Standard Trans. & Overdrive)			
*Studebaker Land Cruiser	Dick Griffith	28.1046	60.8465
De Soto V-8	Verne Holmquist	20.3514	49.5558
UPPER MEDIUM (Automatic Trans.)			
Studebaker Land Cruiser	Robert Donkin	24.5763	53.9942
Nash Ambassador Super	Archie Bowen	20.6582	47.7721
Hudson Hornet	Hart Fullerton	19.8181	47.7346
De Soto V-8	Boyd Trombella	17.9770	44.1334
Packard Clipper	Harold Mickelson	17.8957	43.6744
HIGH PRICE (Automatic Trans.)			
Lincoln Capri	Clay Smith	19.7542	52.2891
Chrysler New Yorker	Lew Jabro	17.8322	45.5792
Chrysler Custom Imp.	John Gerfen	16.4463	45.1370
Average—All Cars		21.8466	49.8845

*Sweepstakes Winner

recorded point on each filler pipe, and the over-all weight of each car and its occupants noted down. Beginning at nine, the cars were sent off at one-minute intervals from their home bases. Half went in one direction and half in the other, to prevent bunching up, and the rules required cars to stay 300 feet apart except when passing or in traffic. A small army of officials and mechanics were stationed on the 106-mile course.

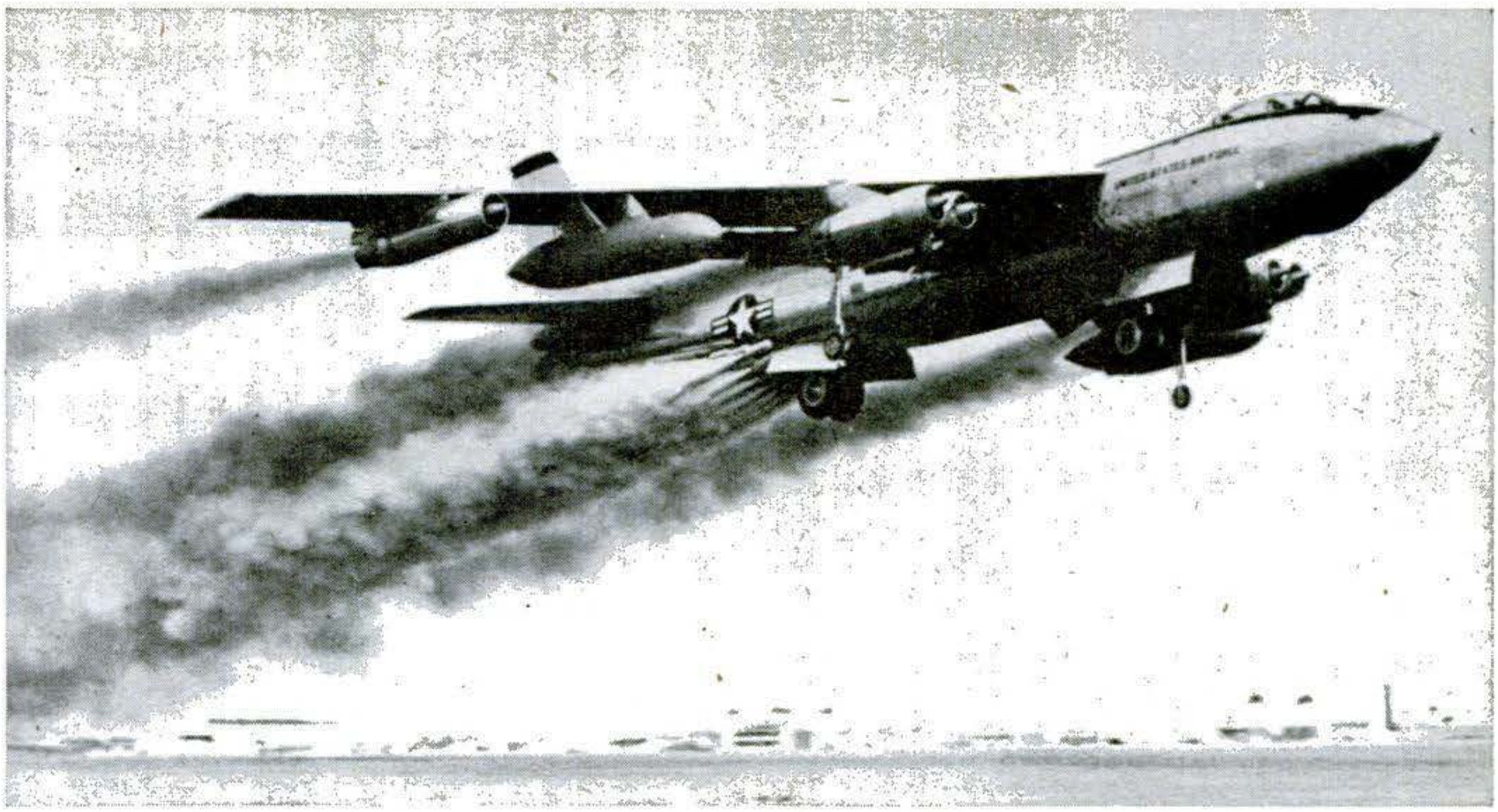
Though the atmosphere was outwardly that of a holiday, the boys and girls who were driving were grimly serious. Collectively they piled up 23,574 miles on their speedometers in 3½ hours—and the worst mishap was one flat tire.

The earnest but enthusiastic response of the youngsters amazed the 70 policemen, sheriffs, and highway patrolmen who officiated. Said patrolman Dwight Bennett: "They certainly proved the value of school driver courses."

Stanislaus County people liked the way it worked so much that they are going to stage a run every year. Scarcely had the news of the event hit the wires when the oil company and auto club began getting requests from other California high schools (87 to date) for help in staging similar runs.

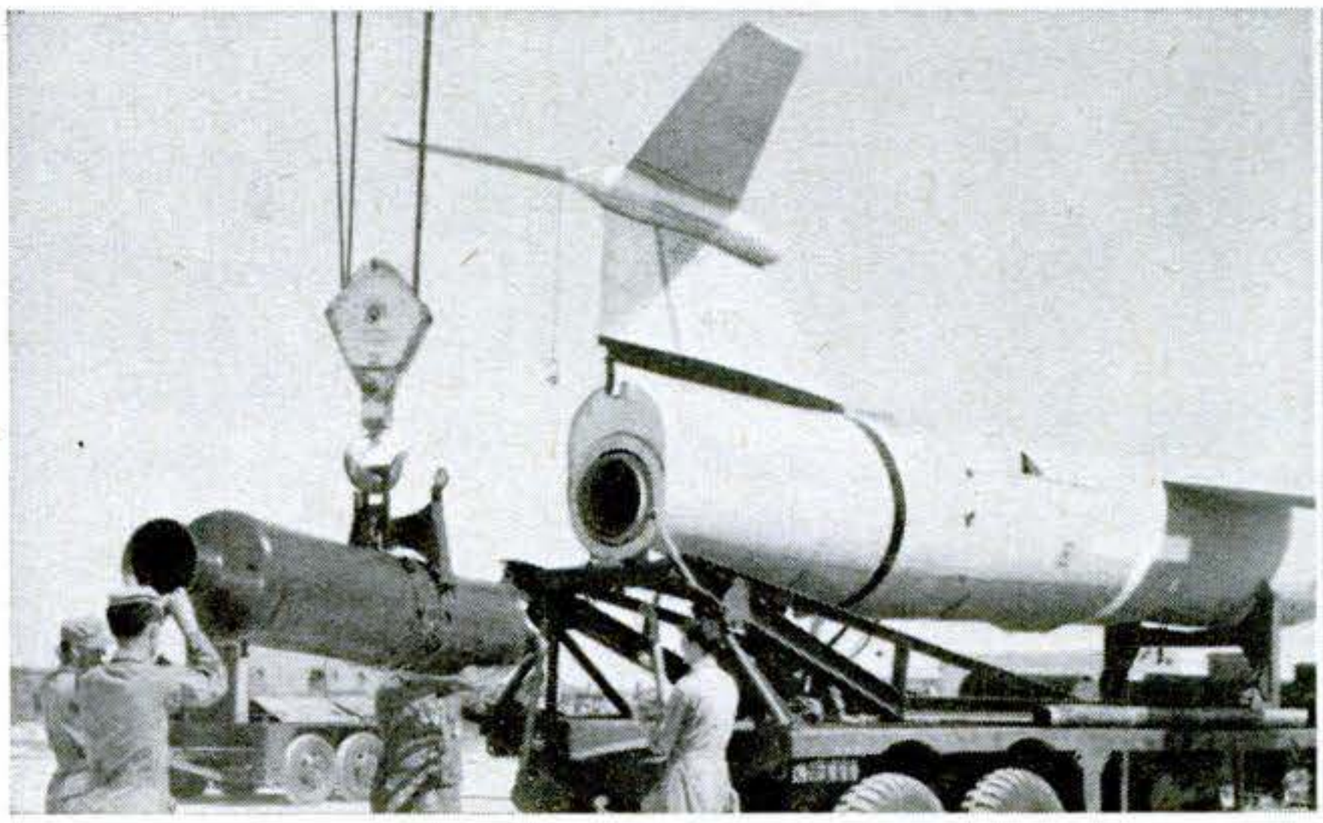
And quite a few persons—Bela Clark is probably one—can see how the idea might grow much bigger, to state-wide eliminations, and maybe even a big national high-school event. END

Copyrighted material



Stratojet Bombers Get Double Power Boost for Tough Take-Offs

THIRTY-THREE rockets are roaring rearward to give this Air Force B-47, six-jet bomber greater power for take-off from shorter fields or with heavier loads. In addition to the 1,000 pounds of extra thrust from each rocket, the engines of this Boeing bomber have a water-alcohol injection system that further increases thrust.

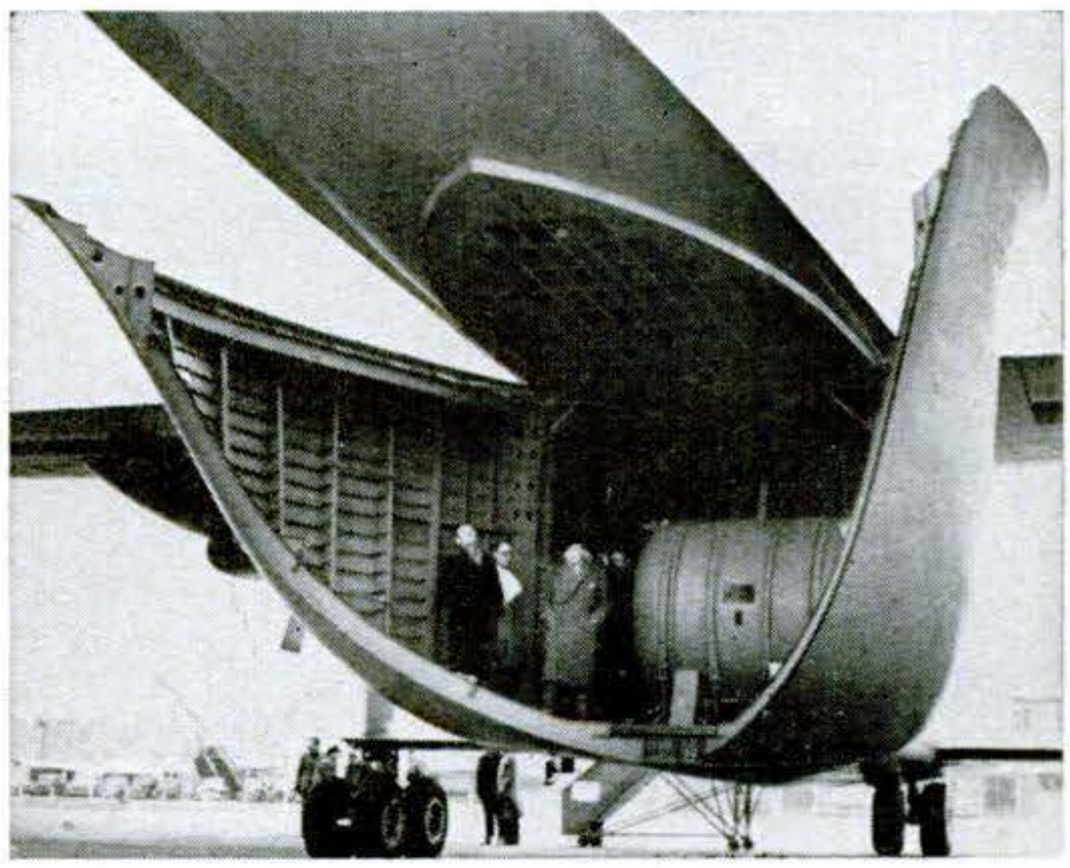


Outboard Helps Push Missile

A ROCKET to add power for take-off is hoisted into the tail of a B-61 Matador. Scientists who developed the pilotless jet bomber (shown poised for launching at right above) see it also as the forerunner of guided missiles to speed air mail.

Air Freighter Opens Wide

WITH 25 tons in its vast cargo hold, the new British four-engine Blackburn Beverley air freighter (right) is said to be able to take off from 3,000-foot runways and almost float down for slow landings.



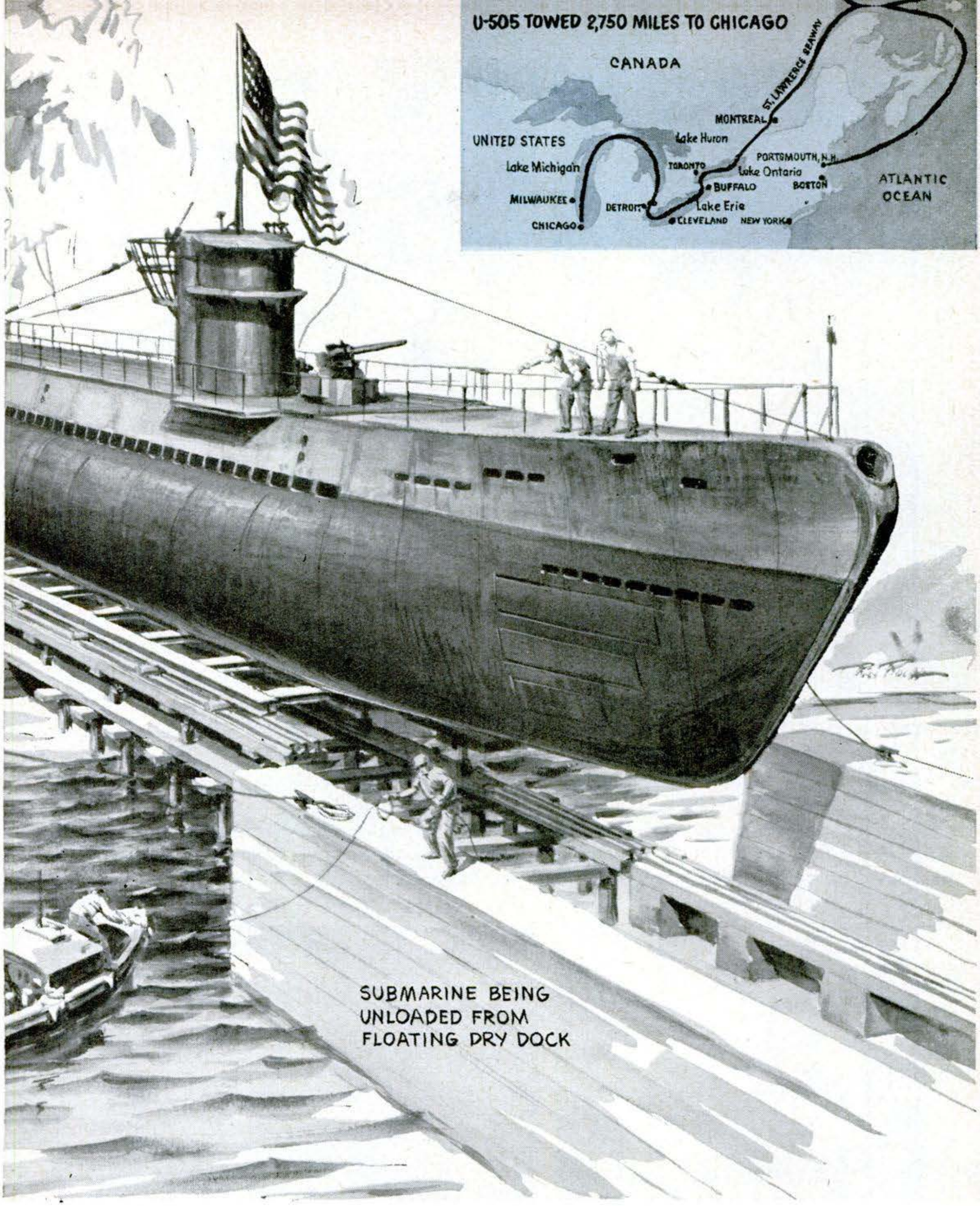
Copyrighted material

They're Parking a Submarine

THE only submarine ever captured on the high seas will come to final anchorage this month high and dry in Chicago.

There, on July 4, the former German U-505, seized by a boarding party of U. S. sailors during the Battle of the Atlantic, will be dedicated as a memo-

Copyrighted material



SUBMARINE BEING UNLOADED FROM FLOATING DRY DOCK

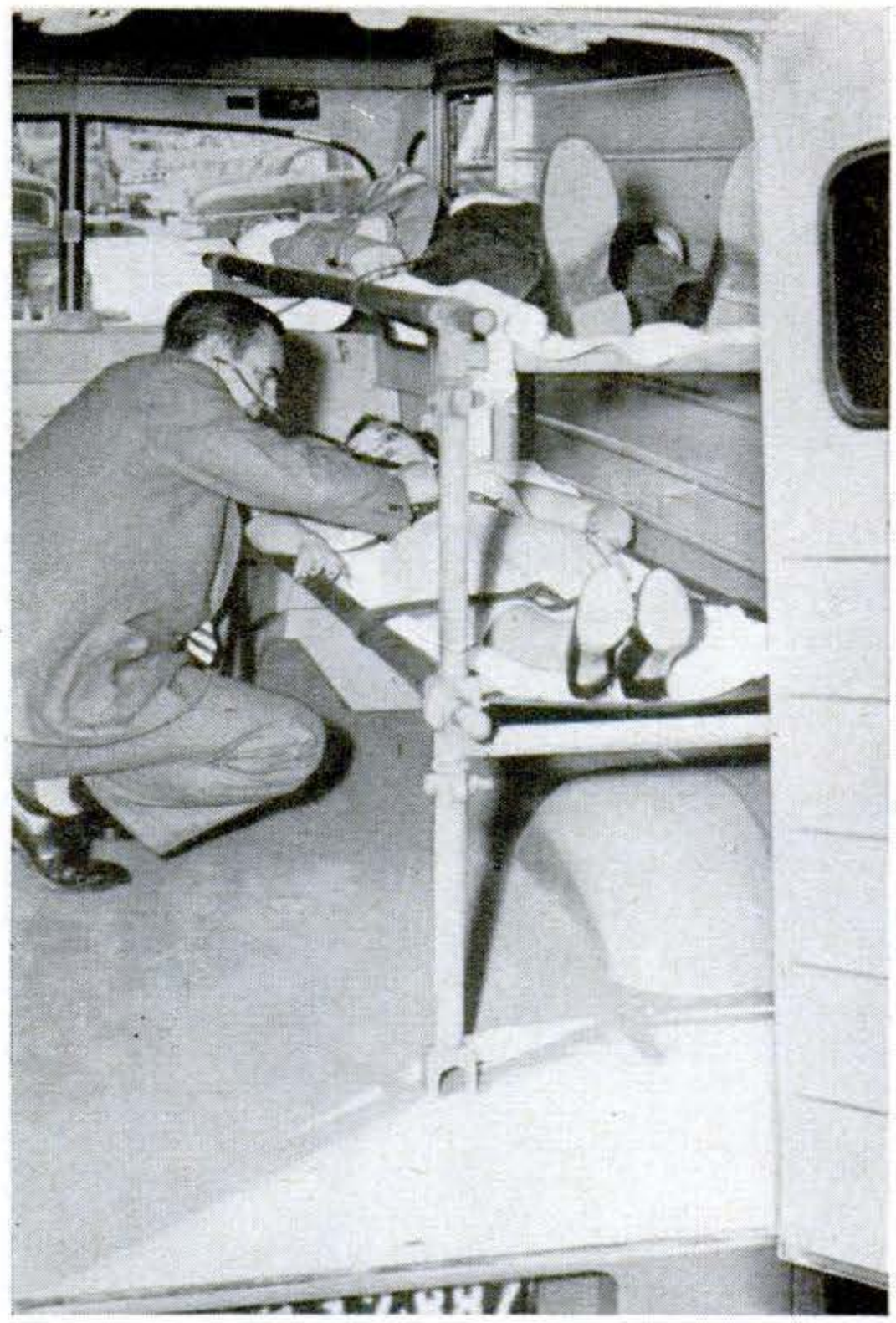
rial to Americans lost at sea in World War II. Public subscriptions are paying for the $200,000 moving job.

Towed to Chicago by the inland water route mapped at upper right, the U-505 will be loaded aboard a floating dry dock, as shown at lower left, for beaching on the shallow shore of Lake Michigan. The larger sketch shows the plan worked out by a retired house-moving engineer, Seth M. Gooder, for the tricky final operation: hauling the 252-foot, 920-ton craft ashore and parking it in concrete cradles as a permanent exhibit at the Chicago Museum of Science and Industry.

Copyrighted material

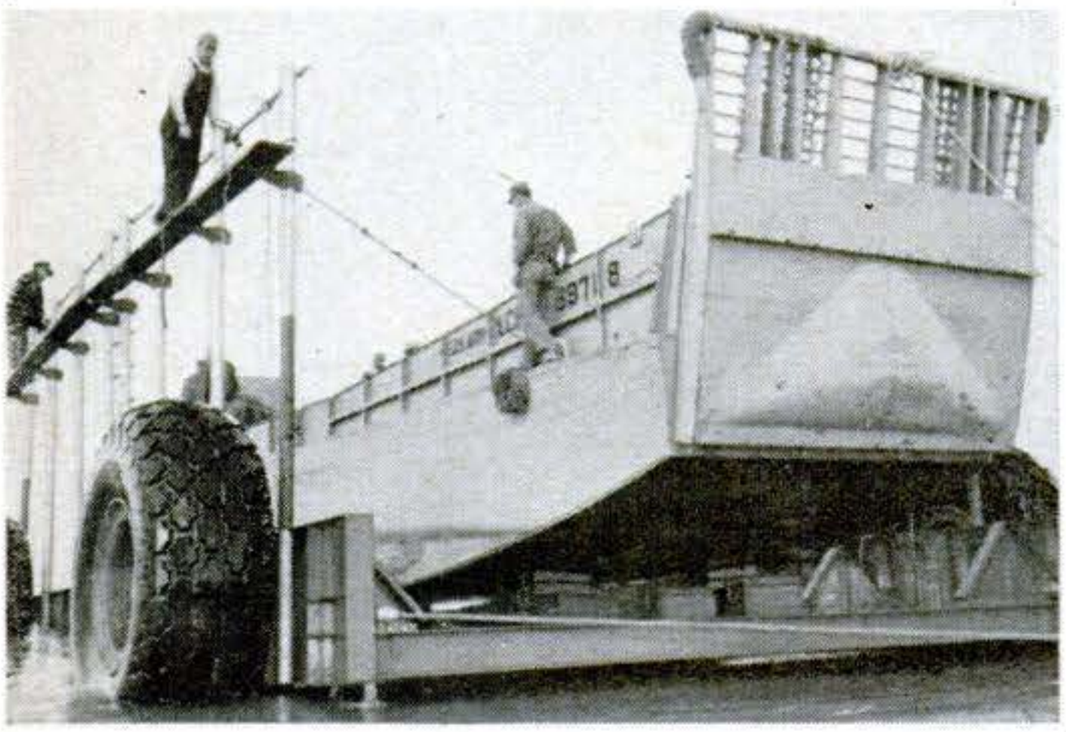
Hammerproof Hat Saves Lumps

THIS man is taking a whack from a hammer without fear or pain. He's wearing a plastic safety liner in his hat. Designed for supervisors on construction jobs where falling objects are a hazard, it's made by Davis Emergency Equipment Co., Newark, N. J.



Litters Stack to Form Bunks

A NEW stretcher for accident or disaster cases doubles as a sleeping cot and turns any truck or freight car into an ambulance. Hinge-jointed aluminum legs lock in open or folded position. The Simmons Machine Tool Corp., Albany, N. Y., makes the litter.



Portable Dock Retrieves Boats

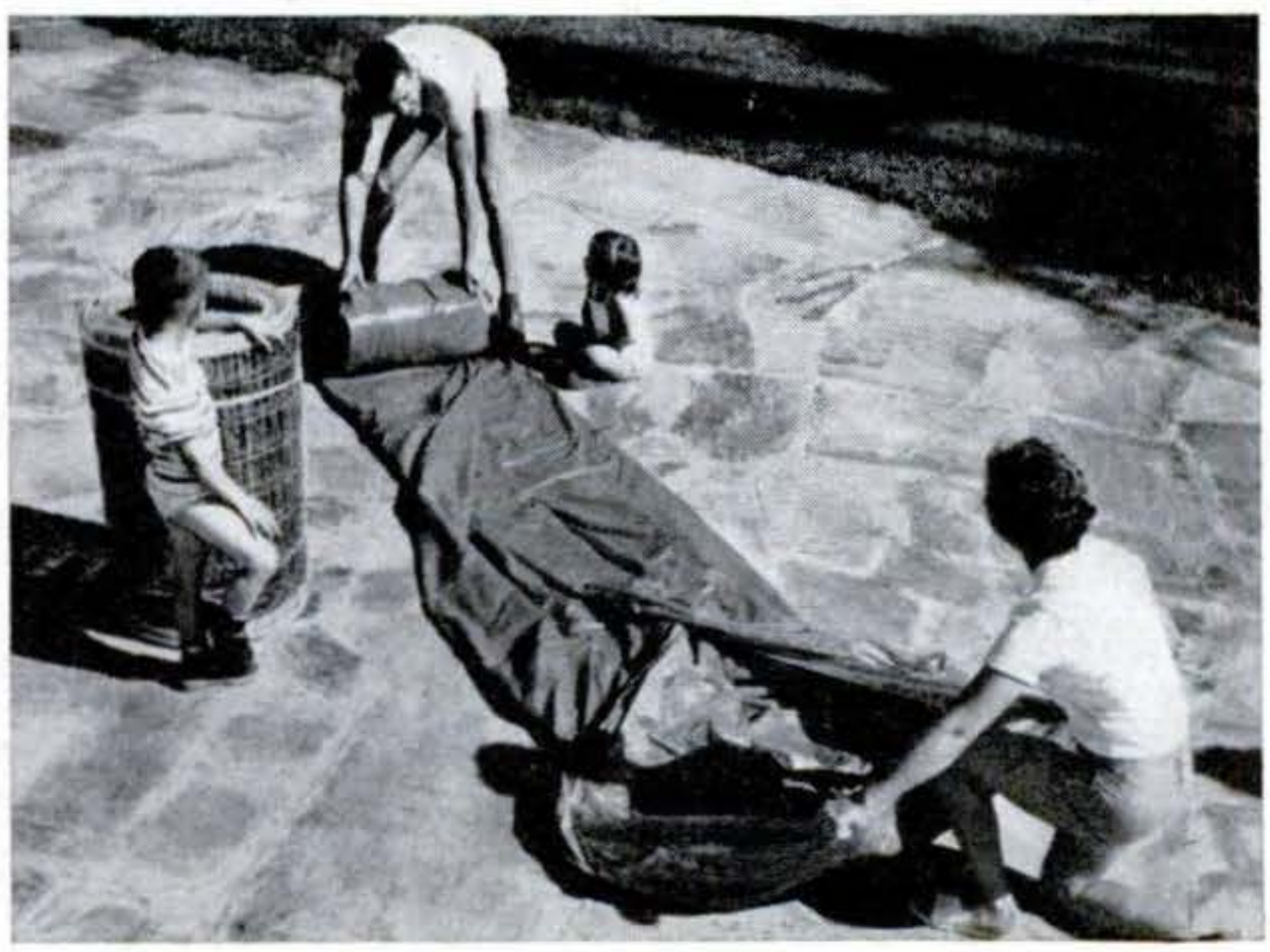
THE Army's newest vehicle is a portable marine railway for picking up disabled craft, like the LCVP above. Boats as heavy as 75 tons can be guided aboard on tracks and brought to shore for emergency repairs. The dock leaves the water on four huge wheels.

Slot Machine Takes Dictation

DICTATING booths installed in hotels, railroad stations and airports may soon give traveling businessmen an office away from the office. One quarter in a slot buys a mailer and recording belt. A second coin turns on the dictating machine.

Copyrighted material

You Don't Need a Hole for This Swimming Hole

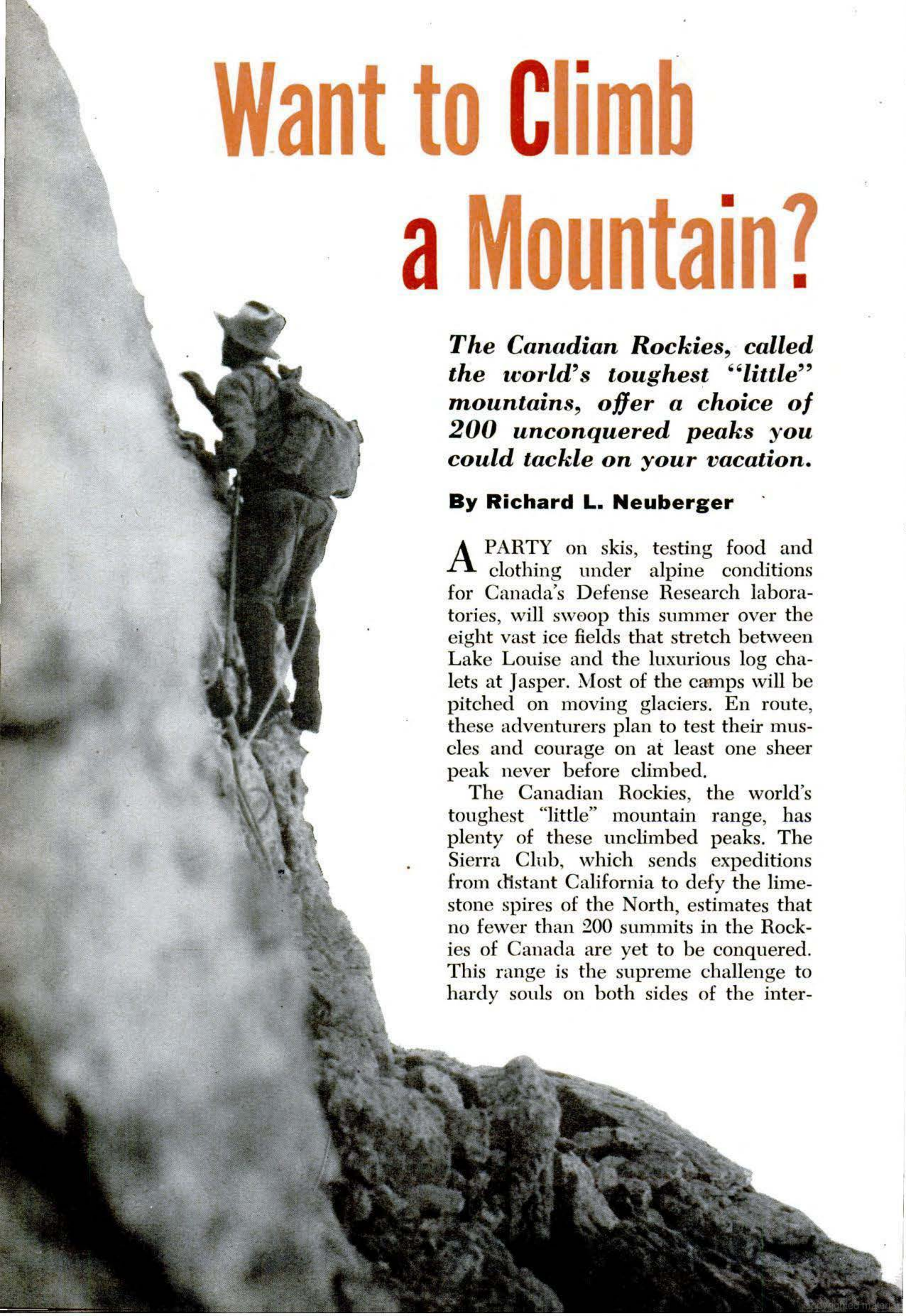


IF YOU have 300 square feet of flat space on your lawn and $200 worth of folding stuff in your wallet, you can own a portable swimming pool like the one above. Its sides consist of rigid wire fence that comes in a roll. Its lining is made of durable, heavy-gauge plastic and it resists abrasion by dirt, sand and gravel.

The portable pool, made by Bilnor Corp., Brooklyn, N. Y., is available in four sizes. The largest, shown here, is 20 feet in diameter and holds 7,000 gallons of water.

UNROLLING THE LINING of their new pool, the family above have decided to save time by setting it up on a flagstone terrace. The young boy is leaning against the roll of fence, three feet high, that will form the sides of the pool. At right, the fence has been unrolled and its ends are about to be tied together. An inflatable bumper can be fitted over top to protect against scratches.

Want to Climb a Mountain?

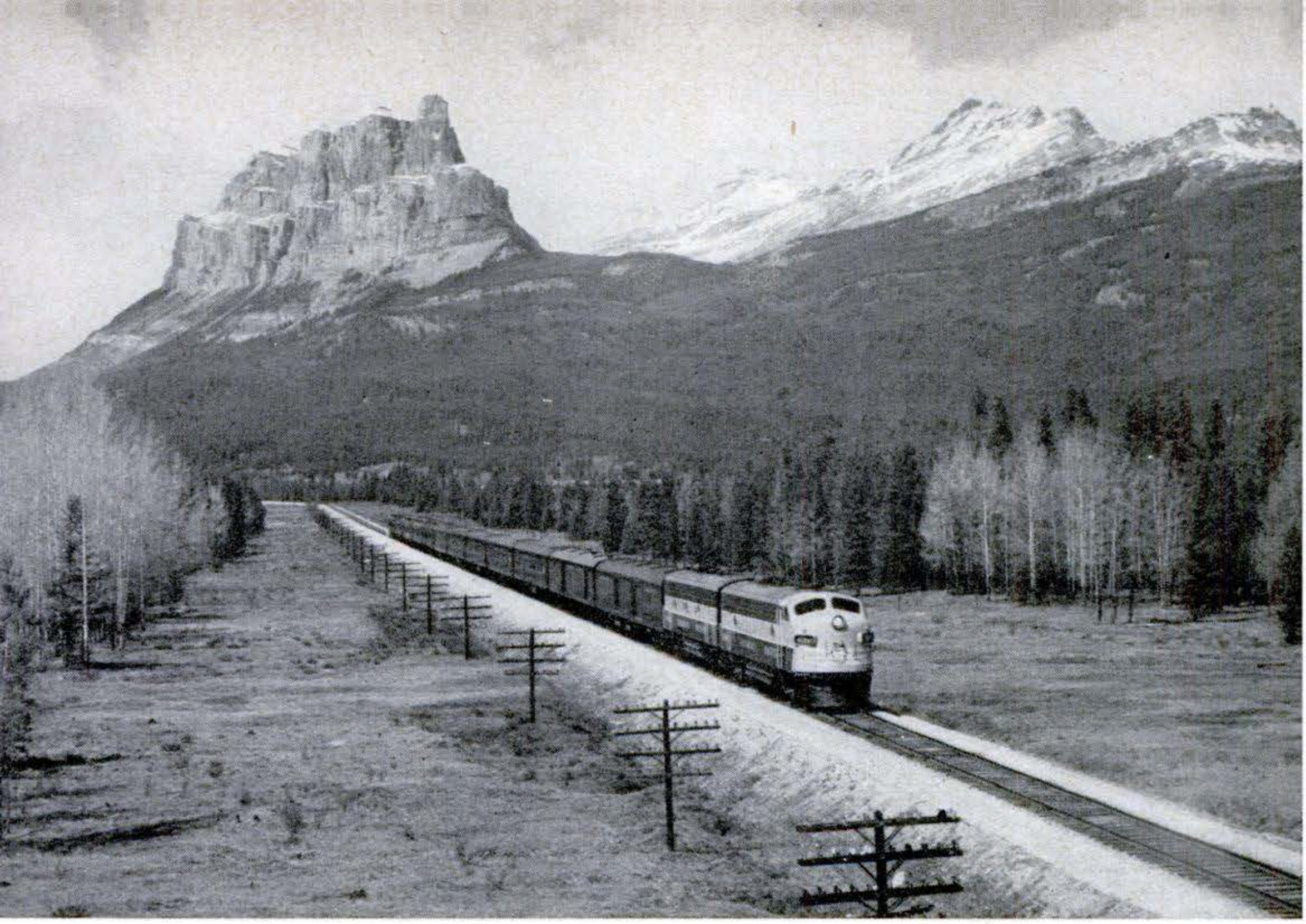


The Canadian Rockies, called the world's toughest "little" mountains, offer a choice of 200 unconquered peaks you could tackle on your vacation.

By Richard L. Neuberger

A PARTY on skis, testing food and clothing under alpine conditions for Canada's Defense Research laboratories, will swoop this summer over the eight vast ice fields that stretch between Lake Louise and the luxurious log chalets at Jasper. Most of the camps will be pitched on moving glaciers. En route, these adventurers plan to test their muscles and courage on at least one sheer peak never before climbed.

The Canadian Rockies, the world's toughest "little" mountain range, has plenty of these unclimbed peaks. The Sierra Club, which sends expeditions from distant California to defy the limestone spires of the North, estimates that no fewer than 200 summits in the Rockies of Canada are yet to be conquered. This range is the supreme challenge to hardy souls on both sides of the inter-



RISING LIKE A MEDIEVAL CASTLE out of the Bow River Valley, Mt. Eisenhower is 9,030 feet. The final thousand, almost vertical, must be taken with soft-soled climbing shoes.

national border who would gain mountaineering immortality within the limits of a two-week vacation.

Even the peaks that have been subdued are a long way from the staircase category. Mt. Robson, looped like a lariat by the main line of the Canadian National Railways, could not be climbed at all between 1939 and 1953, although dozens of well-equipped parties made the effort.

Steps Up a Tower of Ice

Don Claunch of Seattle, who last summer led the first successful attack on Robson in 14 years, contends that the peak's stratified 8,000-foot face rivals many major mountainsides in the Himalayas and Andes. Claunch chopped innumerable steps on icy slopes overhanging this giddy drop. It was fitting that Claunch should have reached Robson's crest, so long untrod, because he once had been forced to retreat, only 250 feet below the summit, by a fierce gale from the seacoast.

The Canadian Rockies do not begin to qualify for any normal high-mountain league. Robson, loftiest of them all, boasts a mere 12,972 feet in elevation. It would never make the varsity in Colorado, where the tourist passes 14,000-foot summits like pickets on a fence. But many of these relatively low mountains have ramparts as steep as castle walls. Furthermore, the range is still weathering and the rock ledges and holds are loose. An American climber who failed to surmount 8,800-foot Mt. Louis compared his climb to being "on the outside of the Empire State Building, with the window ledges made of cake frosting!"

Some mountains owe their impregnability to remote locations. But Brussels Peak, just off the Banff-Jasper highway, has been humbled only once, and then with so many steel pegs and similar devices that Frank S. Smythe, a famous veteran of the Himalayas, declared stoutly, "I still regard Brussels as definitely unclimbed."

This disputed first ascent of the black

Copyrighted material

VETERAN CLIMBER FRED D. AYRES, a college professor at sea level, led the only successful ascent of 11,000-foot Mt. Alberta made by North Americans. He considered it tougher than Andean 21,000-footers he has climbed. This summer Ayres may try Mt. Brussels.

pinnacle of Brussels Peak was made in the summer of 1948 by a party headed by Ray Garner of Phoenix. On the final 400 feet of the mountain, the climbers had to construct what was practically a metal ladder of pitons. Twenty-four were used, or one of these steel spikes every 15 feet. Purists were offended by these "synthetic" aids.

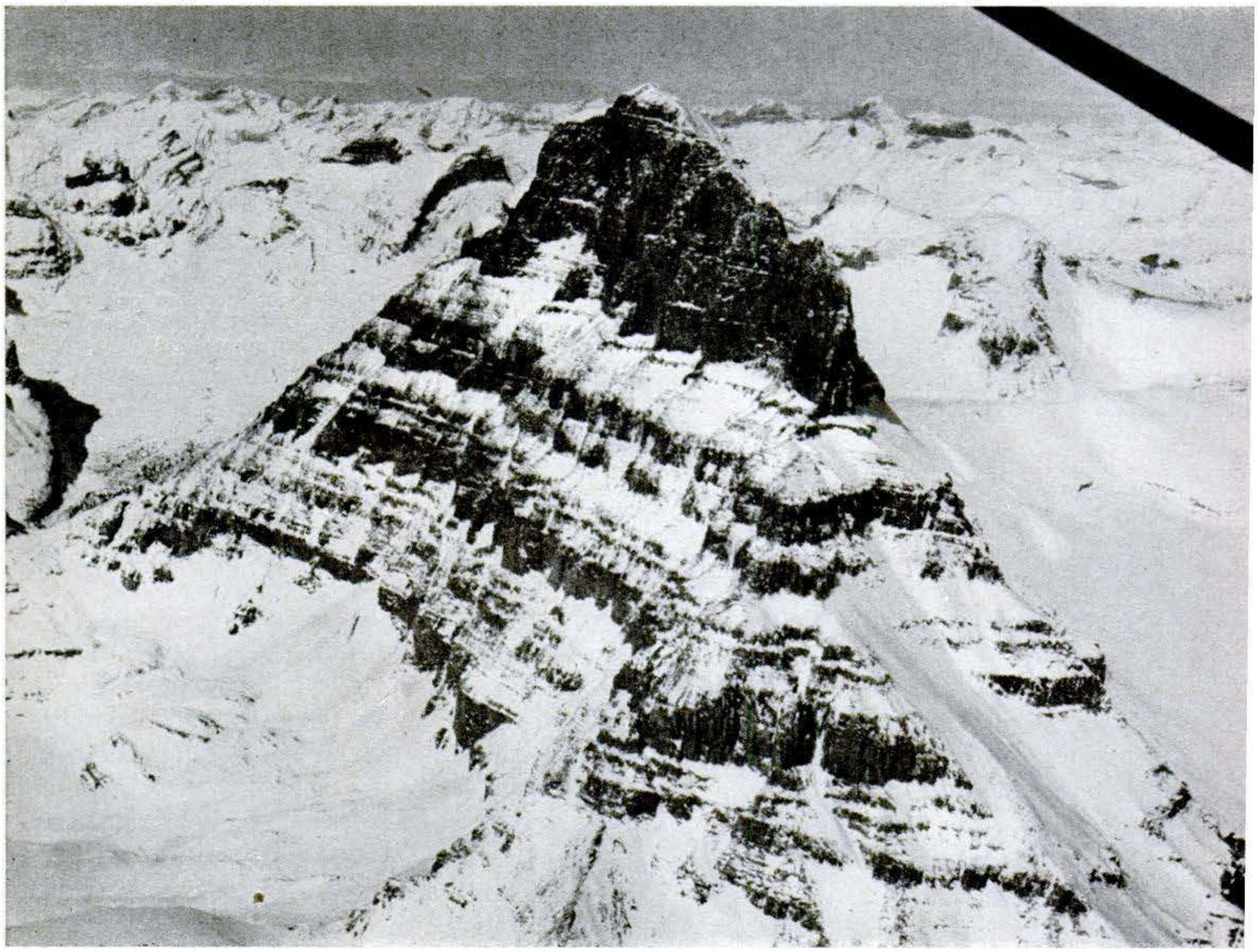
Indeed, one of the most celebrated of Canadian Rockies climbers, Professor Fred D. Ayres of Reed College in Portland, Ore., is outlining an assault on Brussels Peak this year which may topple the turret of rock by ordinary means.

Ayres, who teaches chemistry, is a legendary figure along the jagged boundary between the provinces of British Columbia and Alberta. He saved the honor of this continent by leading, in 1948, the only North American party ever to attain the rapier-edged top of Mt. Alberta—after the sole previous ascent had been made by a team of Japanese daredevils, who did it for the glory of their emperor in pre-Pearl Harbor days.

Symbol of Conquest—an Ax

All the drama and glamour of the Canadian Rockies are wrapped up in Mt. Alberta. For generations, men considered this fortresslike wedge of rock—1,500 feet taller than Brussels—utterly

Conquered only twice, Mt. Alberta has turned back some of the greatest Himalayan climbers.



Copyrighted material

Tallest in the Canadian Rockies, 12,972-foot Mt. Robson has been climbed once in 15 years.

unclimbable. The early fur brigades looked at the 11,874-foot summit in awe. It seemed a realm for eagles alone. Above the lower ramparts, the mountain soared skyward in towering splendor. It was as straight as the front of a vault. But Prince Chichibu sent Japan's six stanchest climbers across the sea, and they made it truly an international project by enlisting the aid of three canny Swiss guides. For 32 hours these nine clung to dizzy battlements. Their hands bled and their feet were numb with cold. But they scaled Mt. Alberta and left behind an ax and a message.

Throughout nearly a quarter of a century brave men tried to get the ax, which was rumored to be of silver. Frank Smythe, the Himalayan veteran, confessed, "Never have I seen any mountain that looked more menacing than Alberta." His party had to retreat a tantalizingly short distance below the top, with their heels suspended over 2,000 feet of empty space. Could even a goat go farther?

But six years ago Fred Ayres and a Cleveland patent attorney named John Oberlin recovered the Japanese ax—which, alas, turned out to be of mere steel, although it is nonetheless now a treasured exhibit in the museum of the American Alpine Club.

Crawling on a Knife Edge

Ayres and his companions chinned themselves up through a series of gaping couloirs, which resembled gigantic elevator shafts hundreds of stories high. The summit ridge, according to Ayres, was "dangerously narrow, with precipitous drops on both sides." Wind currents threatened to blow them into the abyss. It took the climbers two hours to creep along the knifelike ridge to its highest point.

The descent was even more harrowing. Roped together, Ayres and Oberlin inched down the east face of Alberta to a tiny terrace four feet long and two feet wide. It was the most spacious level

[*Continued on page 256*]

Copyrighted material

Home, home on a raft—that's the theme song of Mrs. Erika Bork of West Berlin. The owner of a trailer and a lover of sailing, she devised the raft above to get the most out of her vacation. Arriving at the raft's anchorage, she puts the trailer aboard and does a little water traveling. A small gasoline motor propels the amphibian trailer.

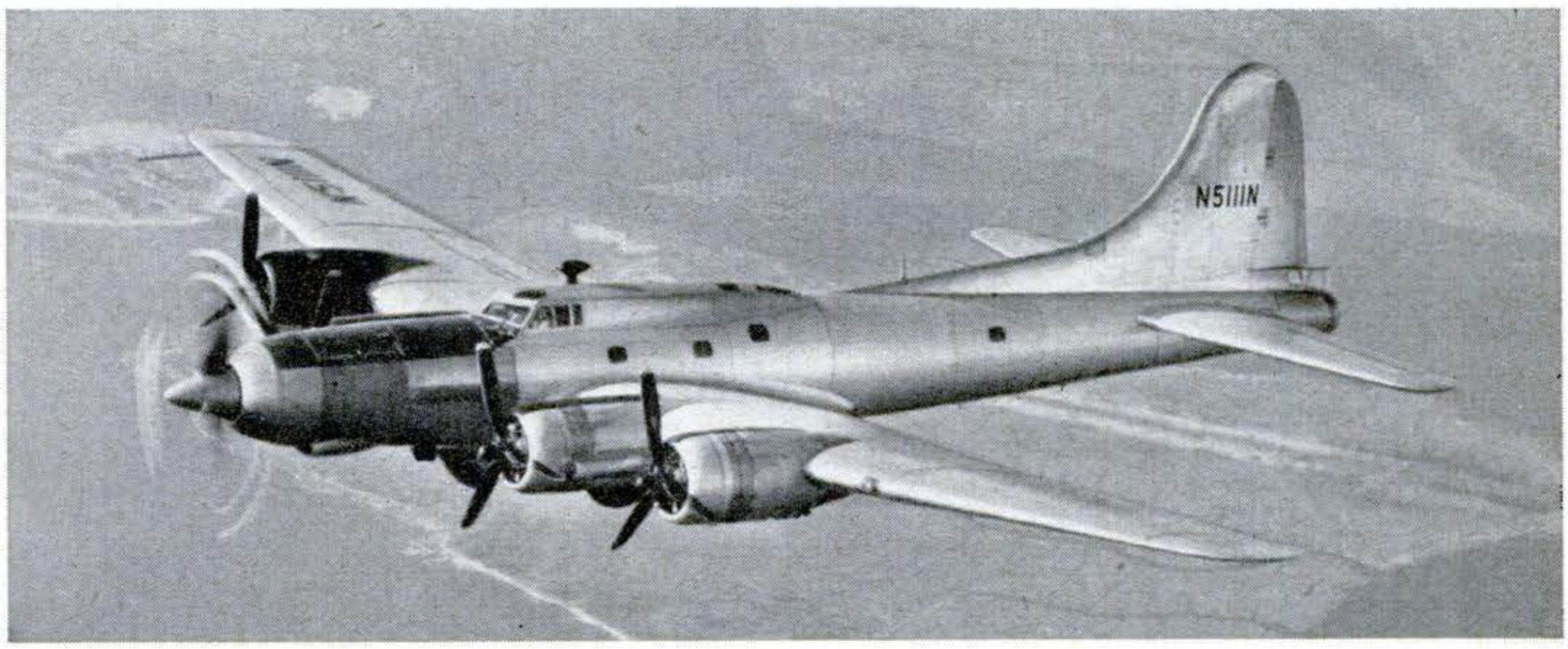
Gypsy Gear From Europe

A motorcycle tow is all you need to hit the road with this bantamweight trailer. Yet it's big enough to sleep two—four with the folding back lifted to form a roof for a canvas shelter. Made of hardboard on a wood frame, it sells in England for about $235.

Portable plumbing for roadside cleanups is a German inventor's idea of what vacation gypsies need. It's a rubber bag with a faucet and basin attached. In use, the private reservoir hooks over the car door and is held steady with suction cups.

Tap the exhaust pipe of your car with this lung saver and you can pump up a sleeping mattress in 40 seconds. The German inventor says the tube filters the lethal gas to prevent you from getting a deeper sleep than the one you bargained for.

Copyrighted material

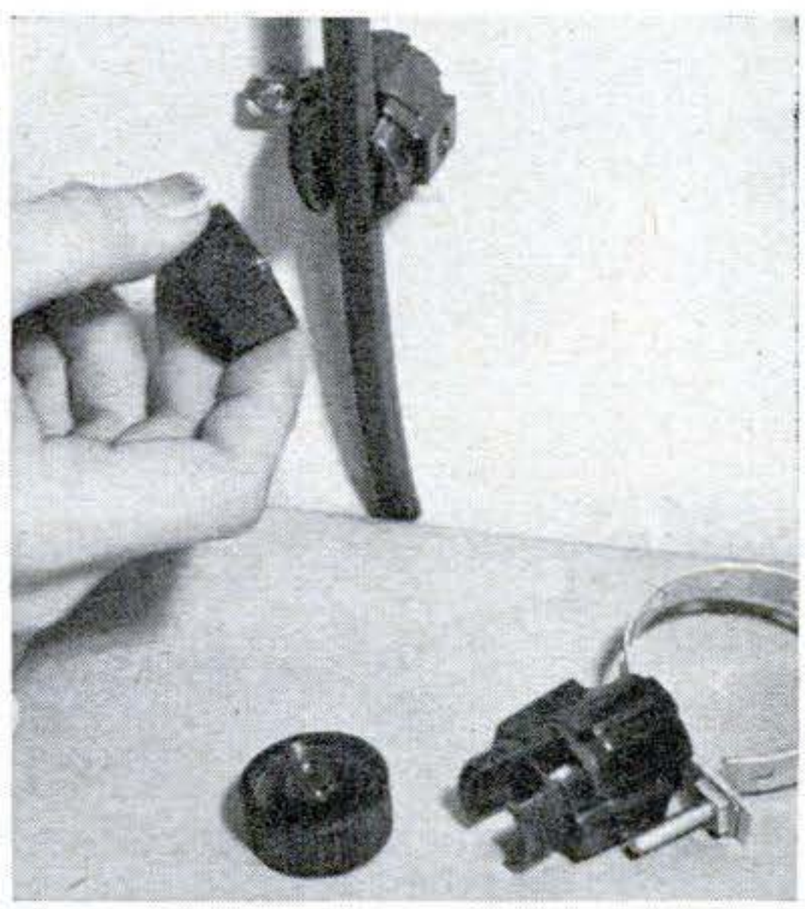


B-17's Fifth Engine Packs More Punch Than Other Four Combined

THIS B-17 feathers its regular props and cuts through space to give a new turboprop a workout. The new power plant in its nose, which will lend 5,700 horsepower to Army and Navy Super-Constellations, packs almost 20 percent more power than the four conventional engines. It combines a Hamilton triblade and a Pratt & Whitney turbine.

Inca Mummy Preserved in Ice-Packed Cave

FOUR HUNDRED years of ice kept this Inca child (right) perfectly preserved in all its colorful regalia through the centuries. The 10-year-old prince or princess (scientists aren't sure yet) was found just this way in an Andes cave 20,000 feet above sea level.

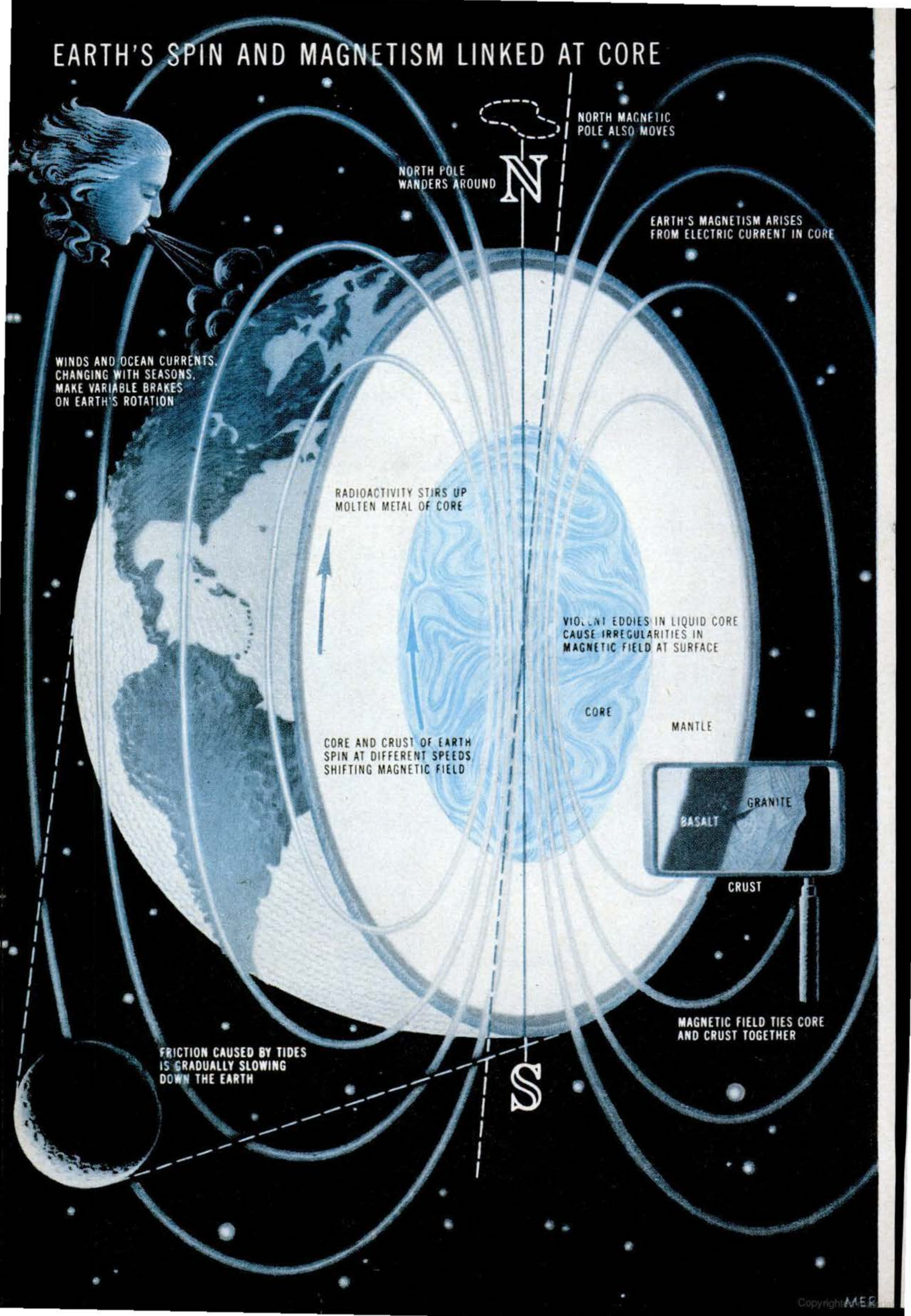


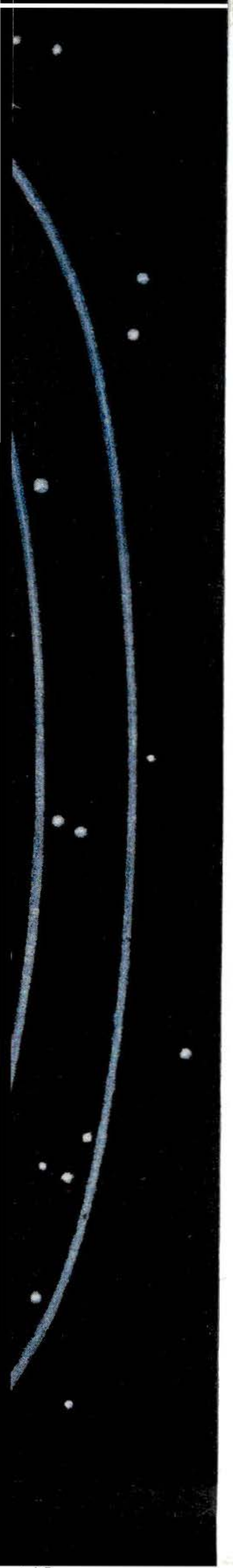
Arrester Fits UHF TV

A NEW lightning arrester for UHF TV sets (above) has a screw cap that forces the wire against sharp staples to pierce the insulation and make contact. It is made by RCA.

Copyrighted material

EARTH'S SPIN AND MAGNETISM LINKED AT CORE





A deadly war weapon showed scientists

What Makes the Earth Wobble

The poles wander, compasses shift, days vary because a heat engine—run by radioactivity—stirs up the earth's core 2,000 miles down.

By Herbert Yahraes

WARTIME research that helped the U. S. Navy overcome a deadly new type of sea mine is paying dividends on an almost cosmic scale. For its findings help answer such old, puzzling problems as—

Why does the earth wobble?

Why are some days too long or too short?

Why does the compass keep changing?

The answers lie in a new idea about what goes on in the middle of the earth—the part called the core, which begins about 2,000 miles under our feet and fills about half of the globe.

The core is a fiery, white-hot liquid, probably molten iron and nickel. Somewhere inside it, electromagnetic forces equivalent in effect to four sextillion (that's 21 zeroes) one-pound magnets are at work. They make the earth itself a magnet, with its field extending for thousands of miles into space.

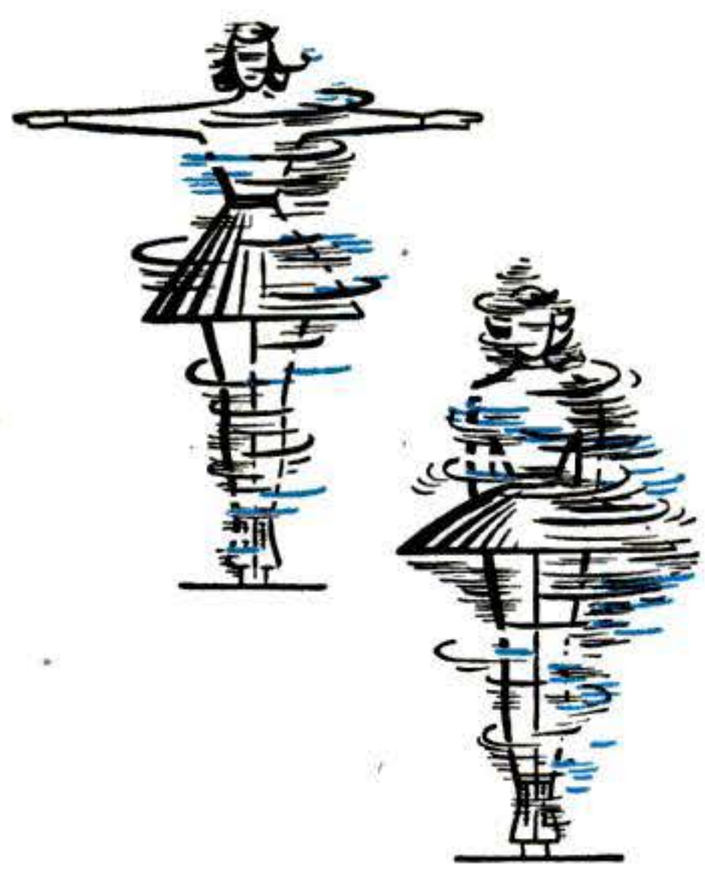
The new idea. A heat engine, powered by radioactive material, kicks up turbulent motions in the hot liquid. As a result, the core of the earth rotates at a slightly different speed than the outer part. This in itself accounts for certain irregularities. Others develop when the earth tries to correct for this difference.

Astronomers noticed about a century ago that the earth

TERRA FIRMA ISN'T SO FIRMA. The old globe's axis wobbles, moving the poles around. (The North Pole is headed for Siberia now.) And the earth's magnetism, always uneven, is continually changing. This makes compass reading a fine art and can play hob with land boundaries. Blame for these vagaries is now laid on the fiery core of the earth, a great blob of molten iron and nickel kept hot by constantly exploding atoms.

Copyrighted material

She Conserves Momentum



Like a skater, the earth spins slower when it stretches, faster when it contracts. That's the law of conservation of momentum

was wobbling on its axis of rotation. They detected the movement by observing a wobbling motion that seemed to be in the stars but was actually in what the astronomers were standing on.

From 1912 to 1918, for example, the North Pole wandered counterclockwise around a circle that was 20 or 25 feet across; in the six years, it made five trips. Irregular movements of this sort are continuing.

The Pole, of course, is the tip of the imaginary line, the axis, on which the earth spins once a day. When the Pole wobbles, so does the rest of the earth. Your house is sometimes 10 feet farther south than at other times.

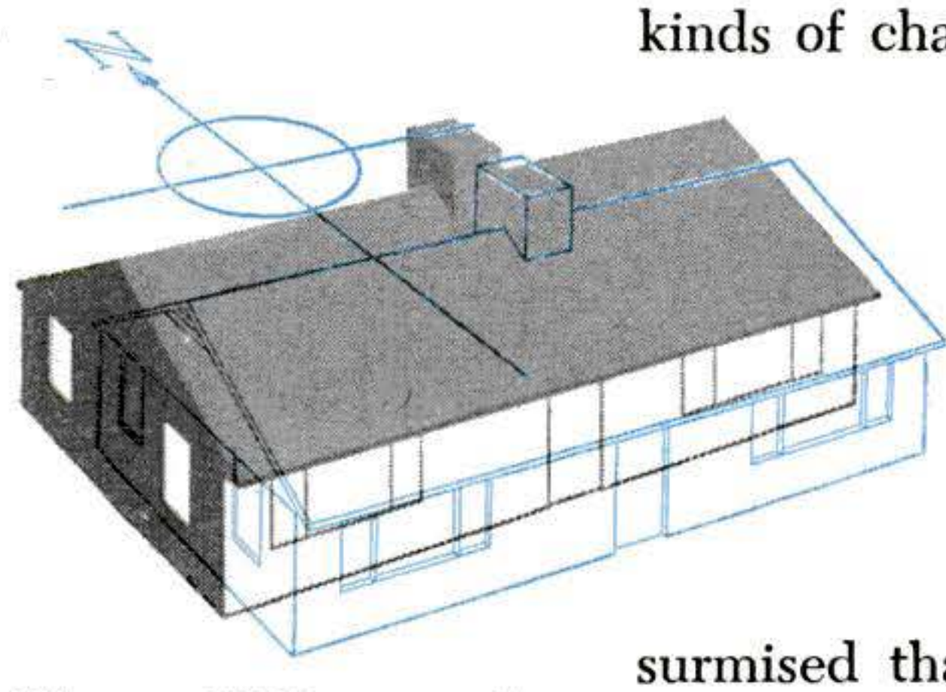
The Pole changes not only in its daily position but also in its average annual position. Every year for some years straight it moved a few feet toward Labrador. Then it went back over much the same path. Dr. D. H. Vestine, one of the geophysicists who have done most to explain these movements, reports that the North Pole now seems to be wandering very slowly toward Siberia.

Days are shorter now. Besides wobbling as it rotates, the earth speeds up or slows down and thus makes a day shorter or longer than it should be. Since about 1910 we have been whirling a little too fast. Before that—back to about 1890—we were moving a little too slow.

The changes don't amount to much—not more than a few thousandths of a second a day, a period too small to be detected on a day-to-day basis, but they add up. After studying the motions of the moon and certain planets, Dirk Brouwer, professor of astronomy at Yale, found that at various times during the last 300 years the earth had been off schedule by as much as 30 seconds—sometimes too fast and sometimes too slow.

The Poles Move

Besides these irregular fluctuations, there are two other kinds of change. Tidal friction has gradually slowed down the earth until it now takes two seconds longer to make a complete turn than it did 2,000 years ago. Also, seasonal changes in winds and ocean currents make the earth rotate six-hundredths of a second too slow in May. But neither of these explanations takes care of the irregular fluctuations.



The wobbling earth sometimes places your house 10 feet farther south than at other times

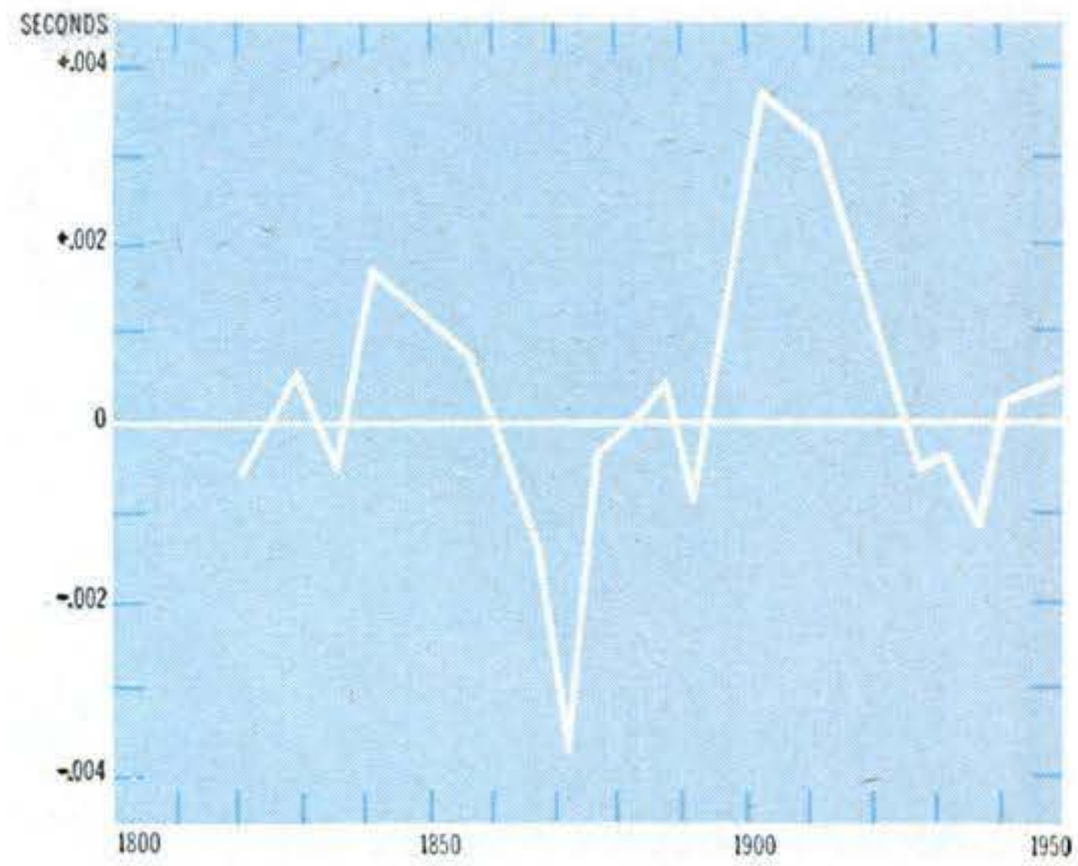
The earth twirls like a skater. Scientists surmised that a basic law of physics known as conservation of momentum was at work. To explain this, Dr. Vestine offers the example of a skater whirling on her toes, her arms out. Suddenly she drops her arms to her sides and picks up speed—because she is more compact.

Similarly, if the earth shrank it would have to go around

Copyrighted material

faster, to conserve momentum; and if it swelled out, it would have to move more slowly. The formation of glaciers does make it swell, and the melting of glaciers does make it shrink, but these changes take place too slowly to account for the irregularities in the length of the day.

The Days Change



The error in what should be 24 hours has been as much as half a minute, but is usually only a few thousandths of a second

Mines showed the way. It was a World War II emergency that led to the solution of both the wobble and the fluctuating speeds.

The Germans had introduced magnetic mines. These didn't have to be hit to explode: if a ship passed over one, moored deep in the water, the ship's magnetic field provided the detonator.

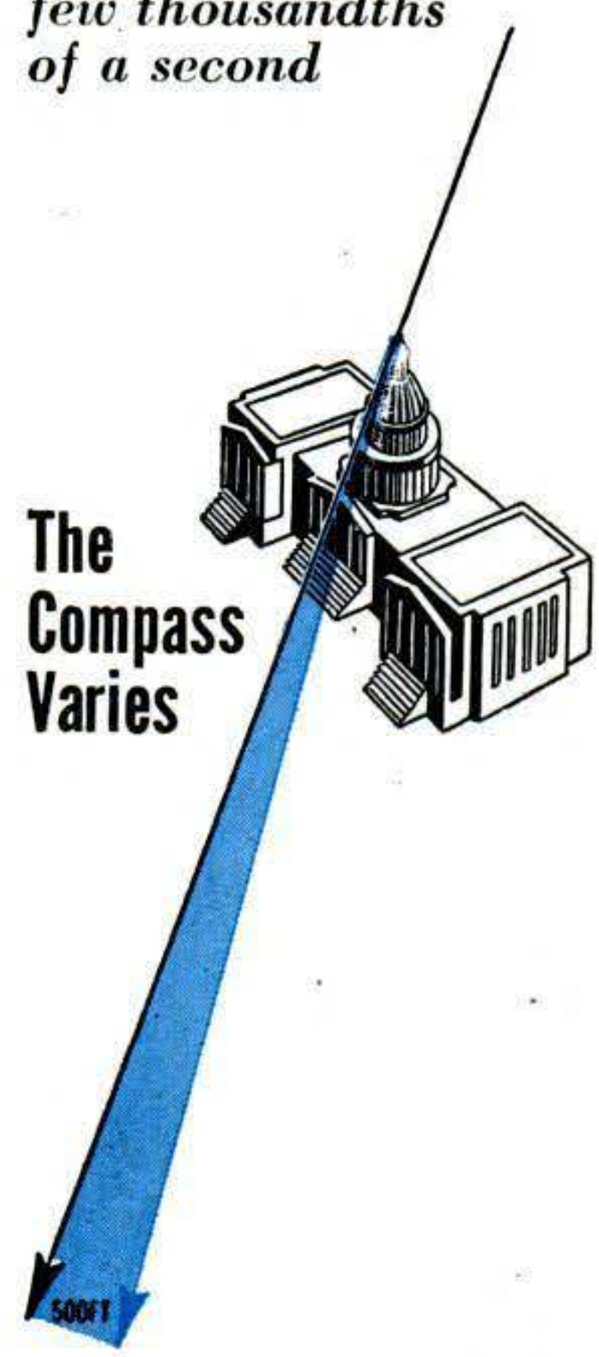
The Navy called on the Carnegie Institution of Washington for help. One geophysicist from its Department of Terrestrial Magnetism—Dr. Ellis A. Johnson—headed a team that worked out a way to counteract the mines through the use of degaussing coils. These were loops of electric cable running around the ship's hull. Charged with the proper amount of current, they produced a magnetic field that neutralized the ship's own field.

To get the data for this antimine project, another Carnegie geophysicist, Dr. Vestine, headed a team that mapped changes in the earth's magnetic field more accurately than they had ever been mapped before.

North isn't always north. These changes have been known for three centuries. As an example, imagine a compass with a needle two miles long. For every change of one degree in direction, the tip of the needle moves about 100 feet. If such a compass had been placed in London in 1580, the north end of the needle would have moved 3,200 feet to the west by 1812. Then it would have begun moving eastward and by the present time would have covered about 1,600 feet.

In Washington, D. C., the changes have been much less, at least in recent times. During the last 60 years the tip of such a needle would have moved not more than 500 feet.

The Compass Varies

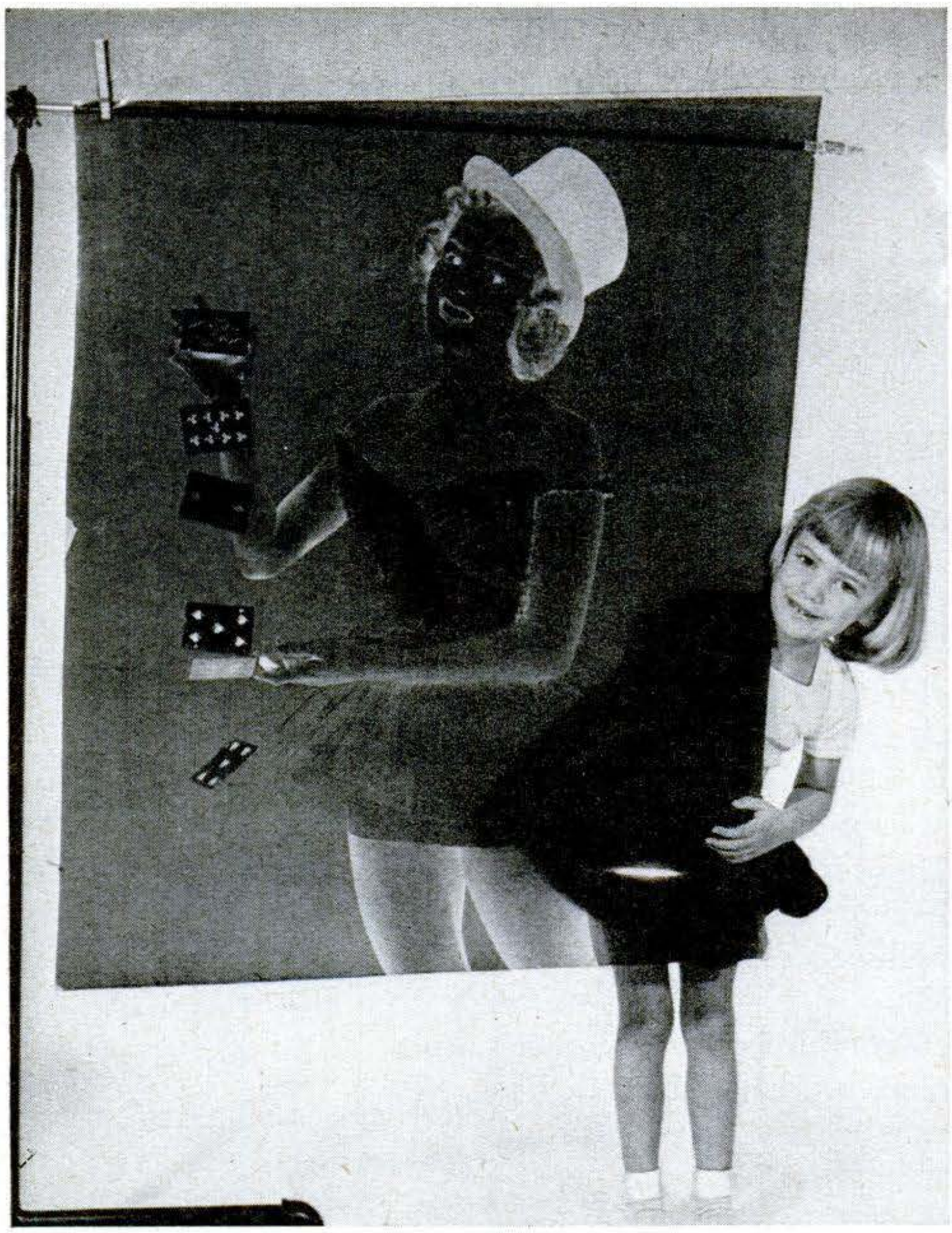


In Washington, D. C., a two-mile-long compass needle would have shifted 500 feet during the past 60 years

Where's that boundary gone? Since plots of land were often laid out by compass, changes in the magnetic field give rise to confusion—and even litigation—about present boundary lines. In eastern New York, for instance, between 1850 and 1950 the needle swung almost six degrees to the west. This means that if your land had been laid out by compass a hundred years ago and you tried to resurvey it

[Continued on page 262]

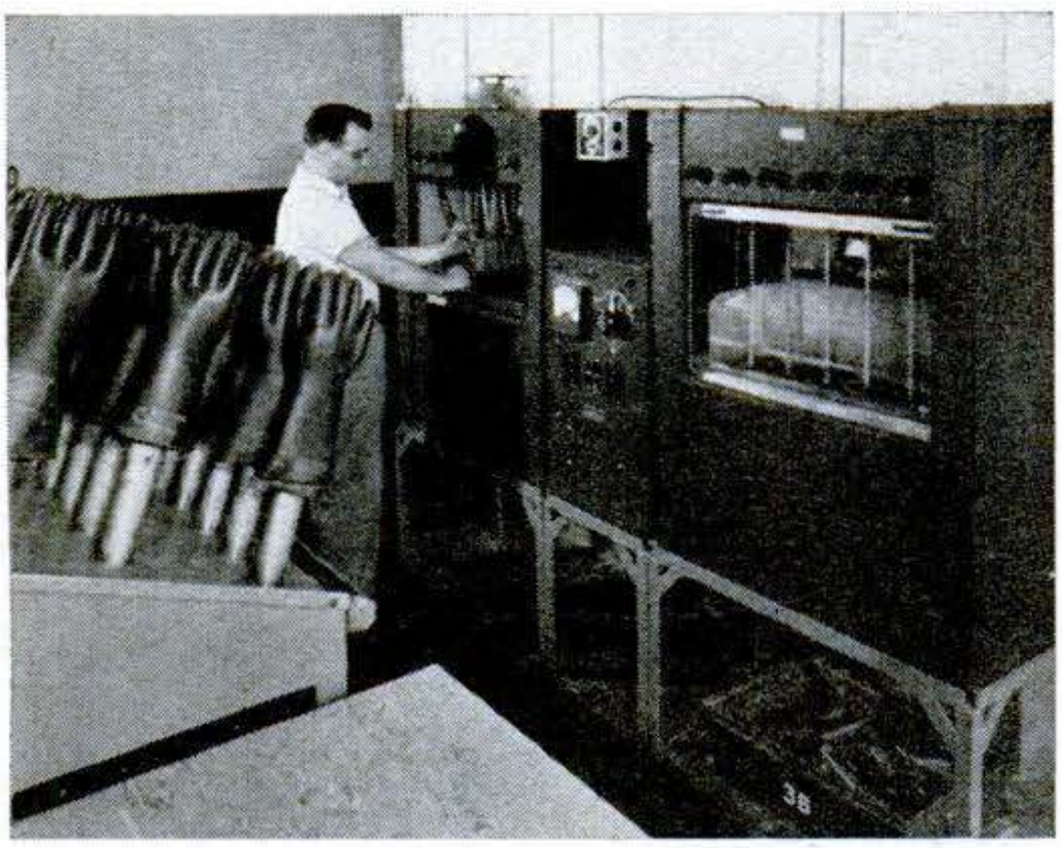
Copyrighted material



Pin-Up Picture Shot Big as Life On Huge Negative

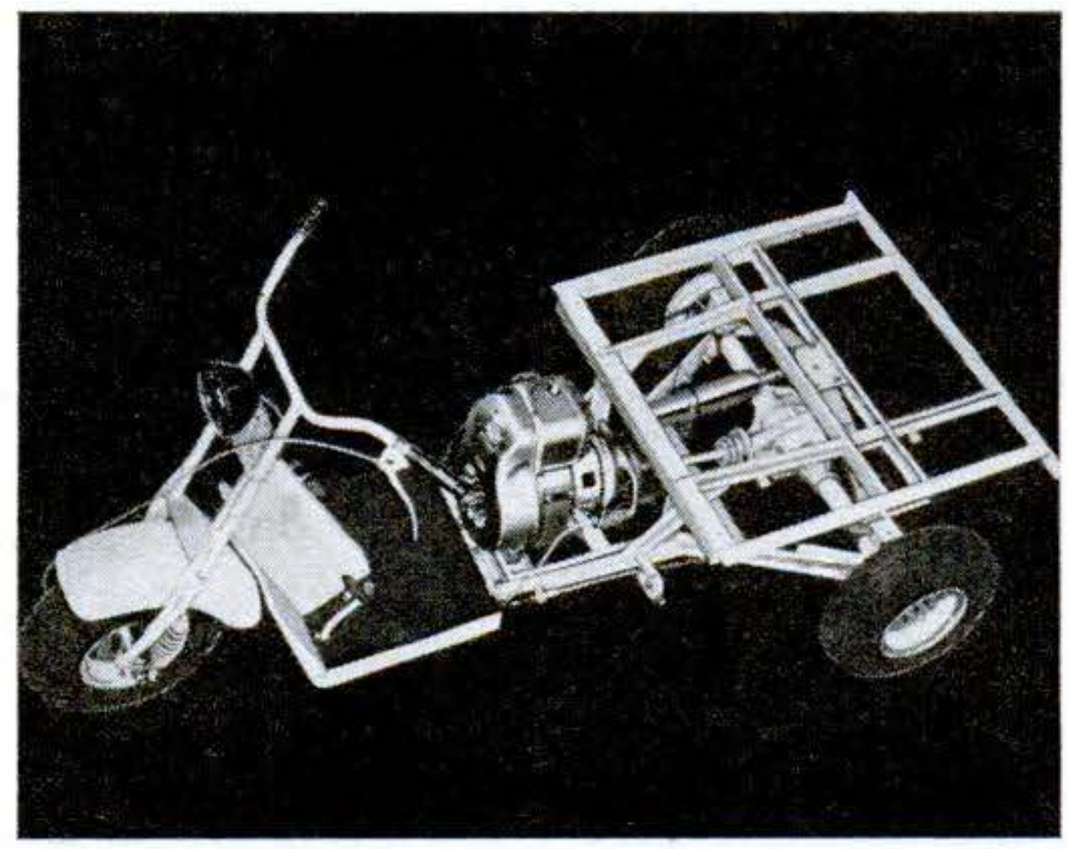
THE huge photographic negative at left, said to be the largest pin-up negative ever made, measures 30 by 40 inches. It was recorded on Du Pont's new "Superior" Press film, which has a daylight speed index of 200, a tungsten-light speed index of 160.

The giant picture was taken by Peter Gowland, Hollywood photographer, with a "walk-in" camera—two rooms, with a 42-inch lens mounted in the wall between them. Gowland reported that the assignment was difficult because the depth of field for the 42-inch lens was less than three inches. This was especially awkward for taking a shot of rapid action.



Gloves Begin Life with a Jolt

A CHARGE of 10,000 volts is built up inside linemen's new rubber gloves at the rate of 1,000 volts a second in the cabinets above. If the electrical leakage from any glove is more than 10 milliamperes, the glove is rejected as unsafe.



Baby Truck Has Shaft Drive

THIS three-wheel light delivery vehicle, a Cushman Truckster, previously had a chain-and-sprocket drive and a front-mounted body. The new model is built like a car, with shaft drive, auto-type differential and a three-speed transmission.

Copyrighted material

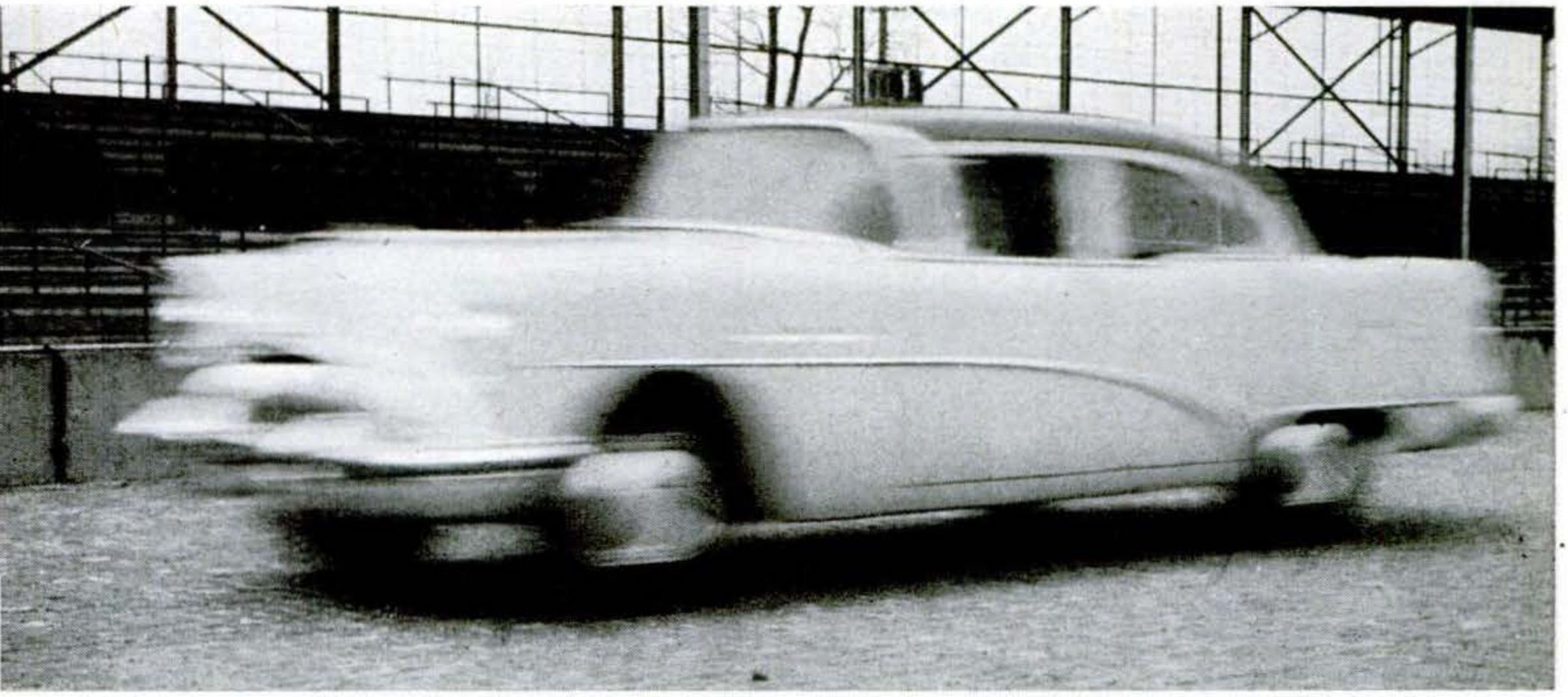
Buick's New Century Is for Smart Drivers

With 200 Roadmaster horses packed into the Special's body, this charger champs at the bit.

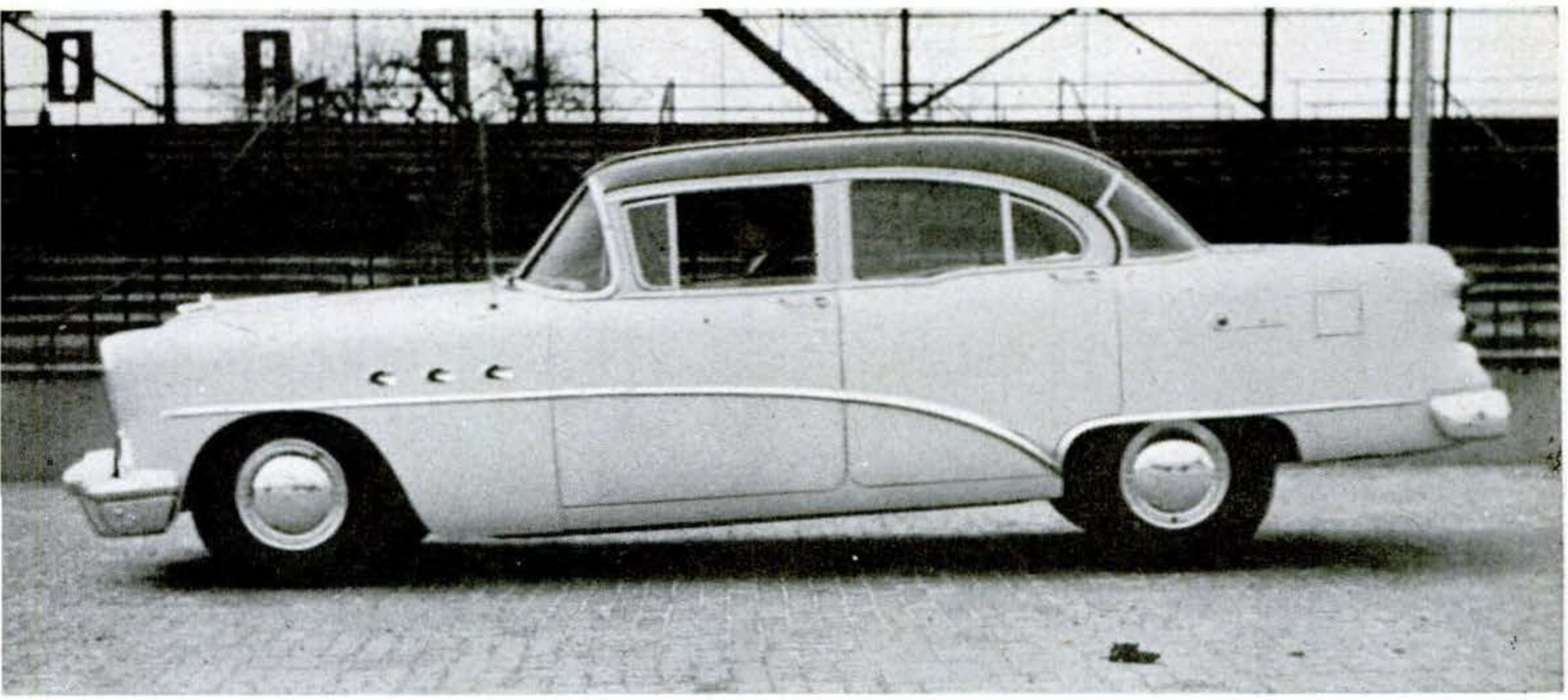
By Wilbur Shaw

THE New York Central calls its crack train the 20th Century Limited. The Buick people like just plain Century for what may prove to be *their* hottest number.

General Motors' second most produc-



You can get her up to 60 in 12.3 seconds, up to 80 in 18.6 . . .



. . . and she'll stop on a button. I made five fast stops from 90.

Copyrighted material

BODY FEATURES on both the Century and Special are the same. Handy aircraft-type heating - ventilating controls are tied up to the cowl air intake.

SEAT ADJUSTMENT (left) is a cinch with the wide, gondola-like body. You can easily slide your hand down to the button without opening the door.

tive division has rolled out a real power package in this revival of a prewar speedster. But what the old Century had, this 1954 fireball has lots more of.

You may remember that the last of the ante-bellum models had the old Buick rocker-head straight-eight. Horsepower was 165 at 3,800 r.p.m. This year's version comes with either a 195-horsepower overhead-valve V-8 and synchromesh transmission, or a 200-horsepower bomb, also a V-8, coupled to Dynaflow.

For this comeback, the Century borrowed its beefy engine from the Pullman-class Roadmaster and its democratic-sized body from that sassy scooter, the Special. Like the Special, its coachwork is three inches lower at the cowl than any of last year's Buicks.

Partly, this 5½-foot road-to-roof swagger, abetted by cut-out fenders and elbow-notched doors, is for styling with a sports-car twist. Partly, it's for low-slung stability, and this the Century, like any ultra-powerful car, needs.

The car leaves nothing to be desired in performance. Its Dynaflow torque converter is smooth; its big engine is quiet. And torque-tube drive combined with coils all around gives a gliding, heavy ride that is unmistakably Buick (PSM, Feb. '54, p. 146).

The acceleration figures I ran on the Century clearly point up its light-footed weight-to-power ratio (about 19 lb. per horsepower), among the lowest in the industry.

My averages (indicated speeds, with no allowance for speedometer error) for three runs in each category were:

0 to 40 m.p.h..... 6.6 sec.
0 to 60 m.p.h.....12.3 sec.
0 to 80 m.p.h.....18.6 sec.

Going from zero to 60 m.p.h., using Low Range only, I averaged 10.1 seconds.

My averages for Drive Range were:

40 to 60 m.p.h..... 6.3 sec.
40 to 80 m.p.h.....14.1 sec.
50 to 70 m.p.h..... 7.3 sec.

Speed to Spare

Unfortunately, a short stretch of the Speedway was littered with building equipment during my tests, and I was unable to run top-speed laps on the car. But I'm told the National Association of Stock Car Racing recently clocked it at 110 m.p.h. on Daytona Beach, Fla.

The Century's brakes grab like a hefty wife on poker night. Running at high speeds and snatching the car down in five consecutive fast stops, I didn't detect any brake fade until the fifth test. Then it was just a slight flattening out at about 15 m.p.h. after nosing down fast from more than 90.

On curves, this crossbred machine shows its good genealogy. In fact, it acts a little like a racing car, due mostly, I should imagine, to the big power plant in a lighter car.

At 95 m.p.h. it took our banked turns nicely except for a tendency to push the front end out from under me, just like a high-performance competition job. Here, in short, is another car that is going to have to be driven with discretion. Man-

Copyrighted material

ufacturers can build in comfort, safety and power, as Buick has in the Century, but they can't factory-install good judgment. The Century's power is for smart drivers.

My only objection to the Century's performance is its power steering. I feel it's too slow for a car this powerful.

General Motors likes to retain what has been called "natural feel" plus higher steering ratios in its hydraulic units. The trouble is that with enough horses to run a fire engine, this car is going to be driven faster than pre-power steering autos could go. At these speeds you need the most responsive steering possible.

Handy Brake, Heat Controls

The brake control, though not new this year, is still handy because you never have to go into a half-twist to operate it. A foot pedal for putting it on, linked to a hand knob at the bottom of the dash for releasing it, will save many a warped sacroiliac.

I like the heat and air controls for their simplicity. The three aircraft-type levers, working through notches in the Century's double-roll dash and plainly labeled, take care of everything. About all you have to remember is to push the two outside knobs down in summer, up in winter. END

In* Popular Science *next month Wilbur Shaw will report on Plymouth's new engine and fully automatic transmission.

EVERYTHING BUT THE KITCHEN SINK seems to be in here. If anybody comes up with a built-in drinking fountain or sandwich grill, auto makers will have to go back to long hoods.

FANCY DESIGNING was needed to get enough vertical trunk space into the shallower body. Buick came up with the same answer as Olds and Caddy: a high-hipped, square trunk lid.

FACTS ON '54 BUICK CENTURY

Model: Century (Series 60) four-door sedan.

Engine: OHV V-8; 200 hp. at 4,100 r.p.m.; compression ratio, 8.5:1; piston displacement, 322 cu. in.; piston travel (in feet per car mile at 20 m.p.h.), 1,331; bore and stroke, 4" by 3.2"; crankshaft bearing surface, 52.8 sq. in.; torque, 309 lb.-ft. at 2,400 r.p.m.

Weight: 3,805 lb.; per hp., 19.03.

Transmission: Dynaflow (torque converter) and 3-speed synchromesh (standard); rear-axle ratios, Dynaflow 3.4:1, synchromesh 3.9:1.

Steering ratio: 24:1 (power); 26.7:1 (manual); radius of turning circle, 20.8'.

Effective brake-lining area: 207.5 sq. in.

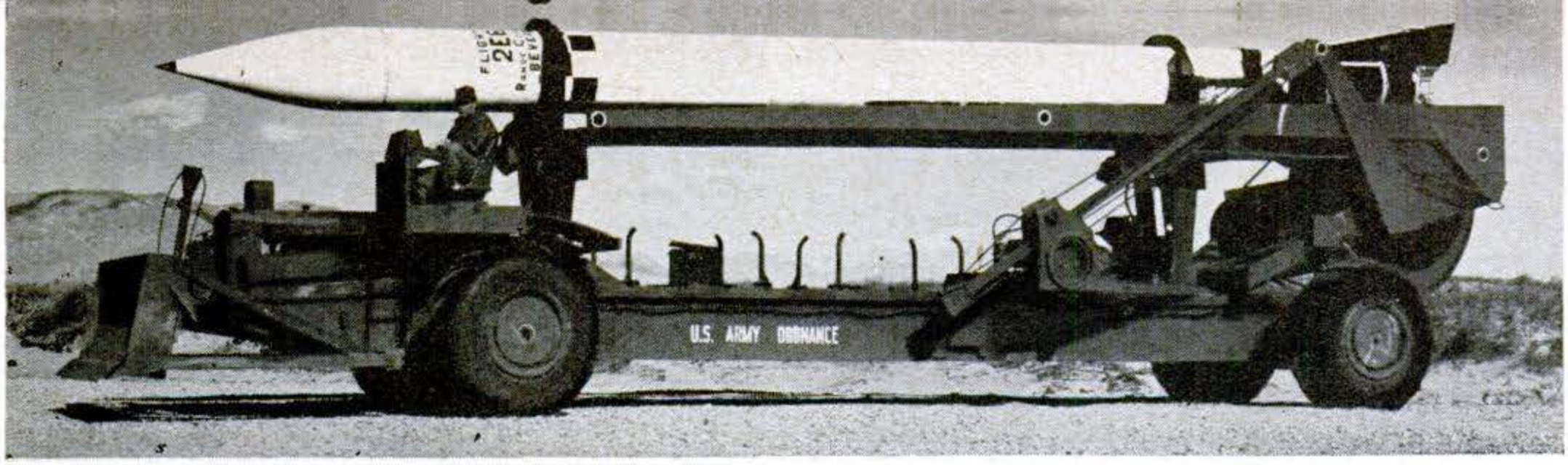
Springs: coils all around.

Outside dimensions: height, 60.5"; overall length with bumpers and guards, 206.3"; width, 76.6"; wheelbase, 122"; overhang, front 35.6", rear 48.7"; tread, front 59", rear 59".

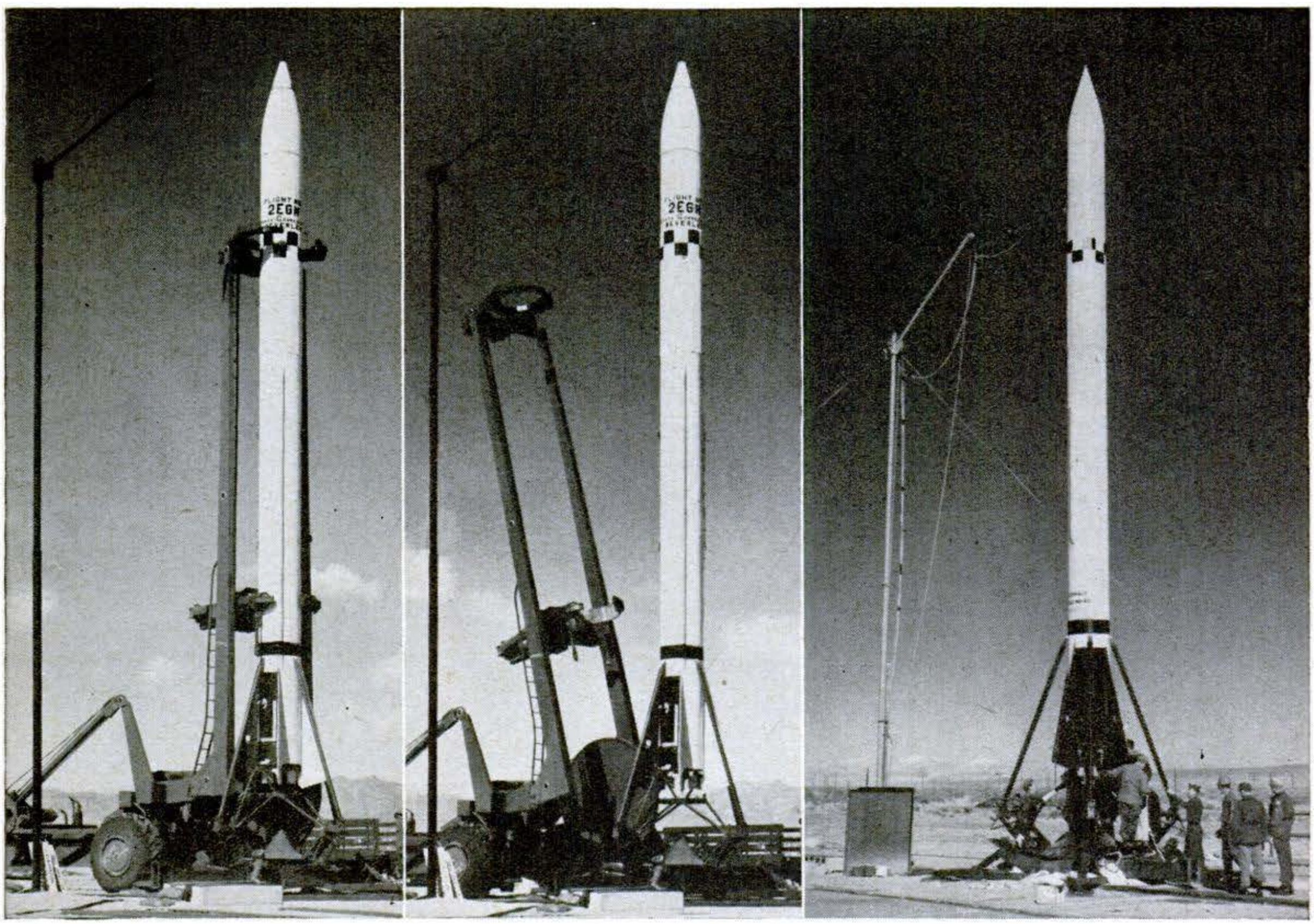
Inside dimensions: seat-cushion width, front 62.5", rear 62.4"; leg room, front 42.3", rear 41.4"; headroom, front 35.6", rear 34"; seat height, front 12.8", rear 12"; vertical distance, steering wheel to seat cushion taken on arc, 5.5"; front-seat adjustment, horizontal 4.4", vertical 1.2".

Tire size: 7.60 by 15.

Copyrighted material



The Corporal's mobile launcher has mechanism at rear that raises it into take-off position.



With the Corporal elevated to firing position, the ground crew makes its final adjustments.

A GUIDED missile has joined our troops—and push-button warfare is one step closer. The new weapon can carry an atomic warhead. It is rocket-powered to hurtle through space at several times the speed of sound. With a far greater range than the new 280-mm. atomic cannon (about 20 miles) or the Honest John rocket shown on the next page, it will give field commanders a weapon with which to strike deep behind enemy lines.

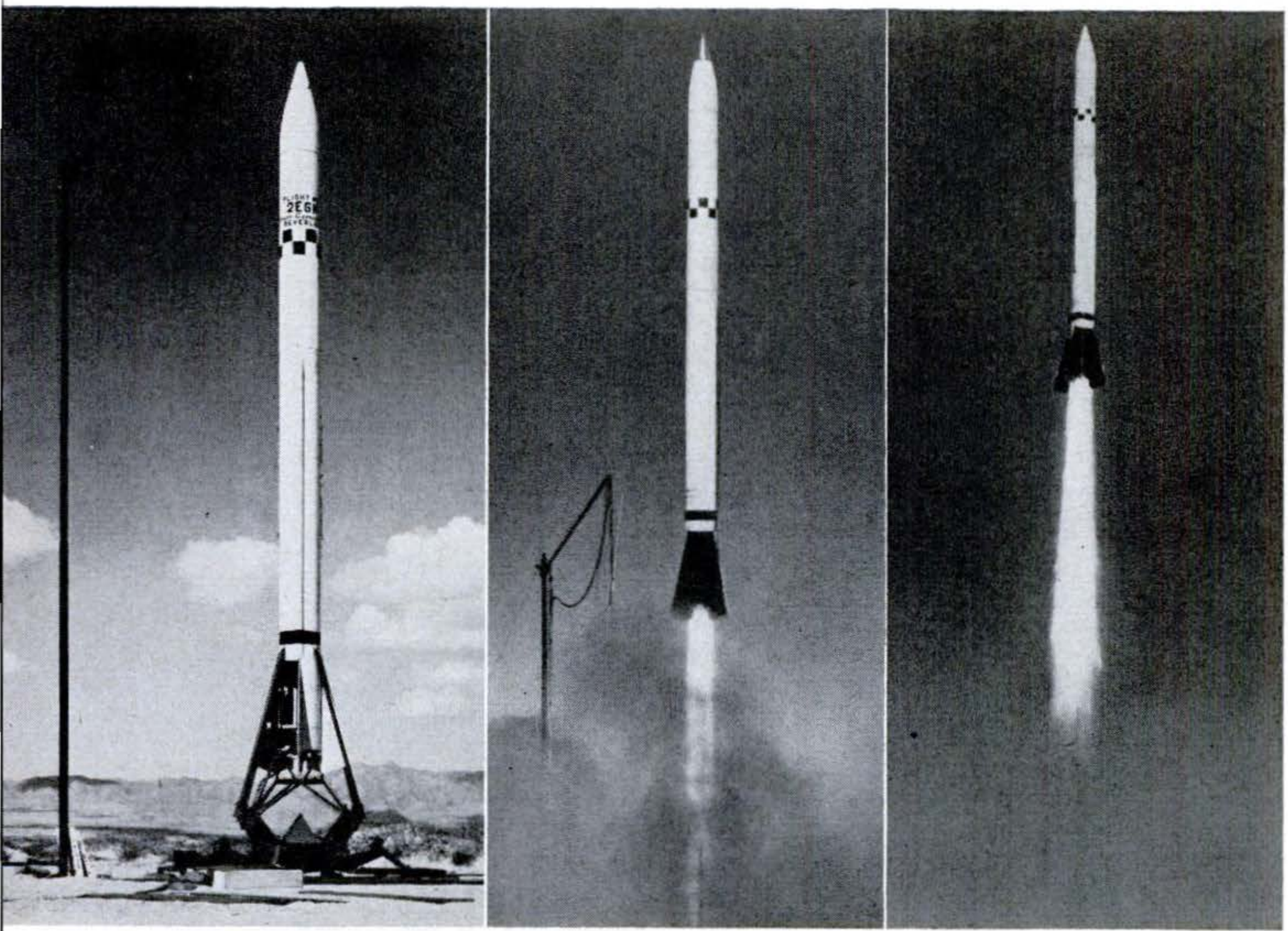
Its name is the Corporal. Its job is to support ground-combat operations.

Since it is electronically controlled in flight, bad weather and poor visibility make no difference to the Corporal. If a target does not warrant an atomic blast, a conventional warhead can be used.

History of the Corporal goes back to 1944, when Army Ordnance asked Caltech to begin studies of a rocket-propelled artillery weapon. Out of this program came such test missiles as the Private, the Private First Class and the WAC Corporal.

Copyrighted material

New U. S. Atom Missile Outshoots Biggest Guns



Set for take-off, the crew is dispersed to safety. Fire rocket! Up it roars, spitting flames.

"Honest John" Can Rocket-Fire Atomic Ammunition, Too

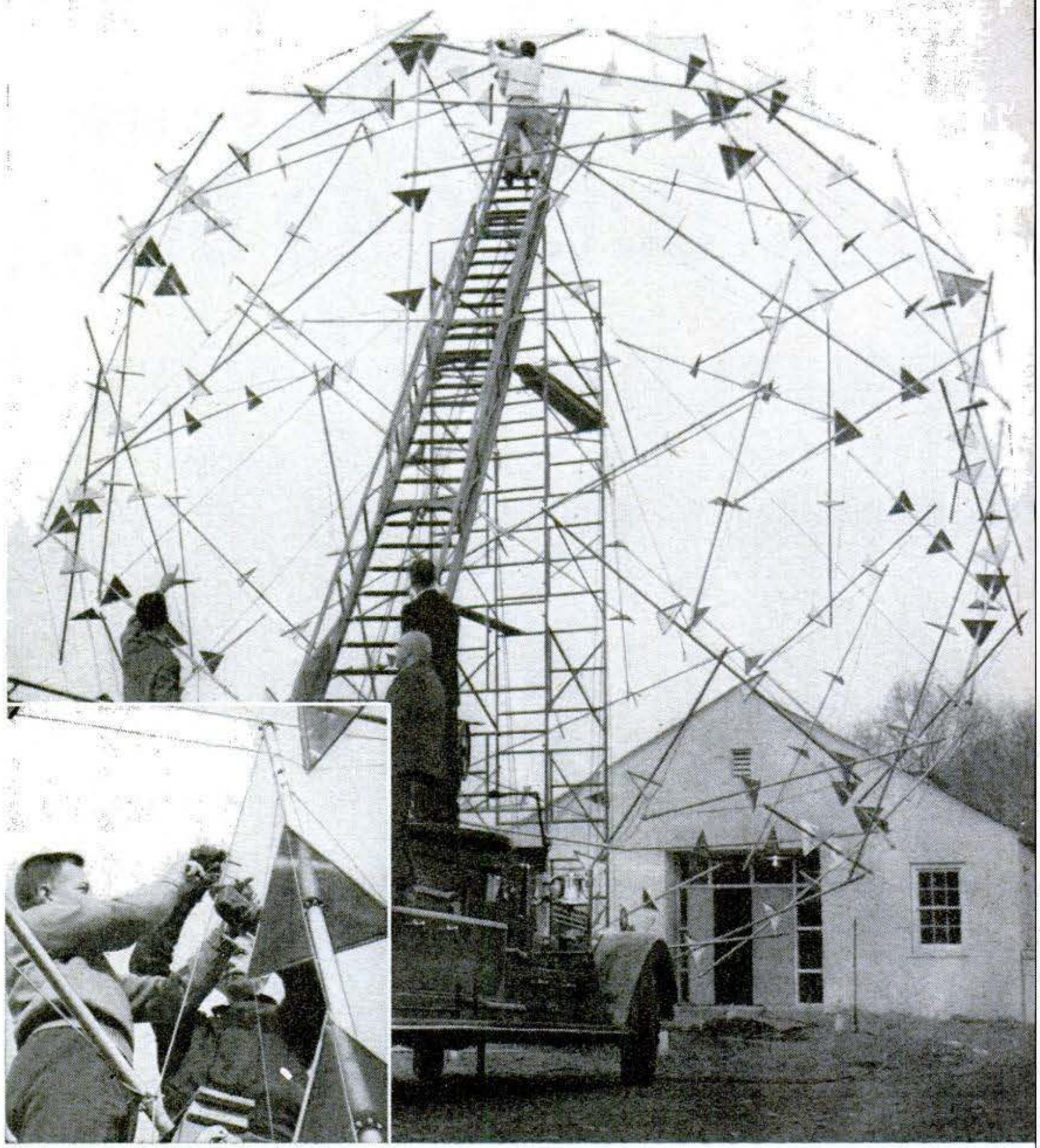
ANOTHER addition to the arsenal of Army weapons is Honest John (right). It is rocket-powered like the Corporal, but is not electronically guided. A close-fire-support missile, it has the range of medium-to-long-range artillery. One of Honest John's high-explosive rounds (it can also carry an atomic warhead) packs the destruction of hundreds of artillery shells. It has a self-propelled launcher.

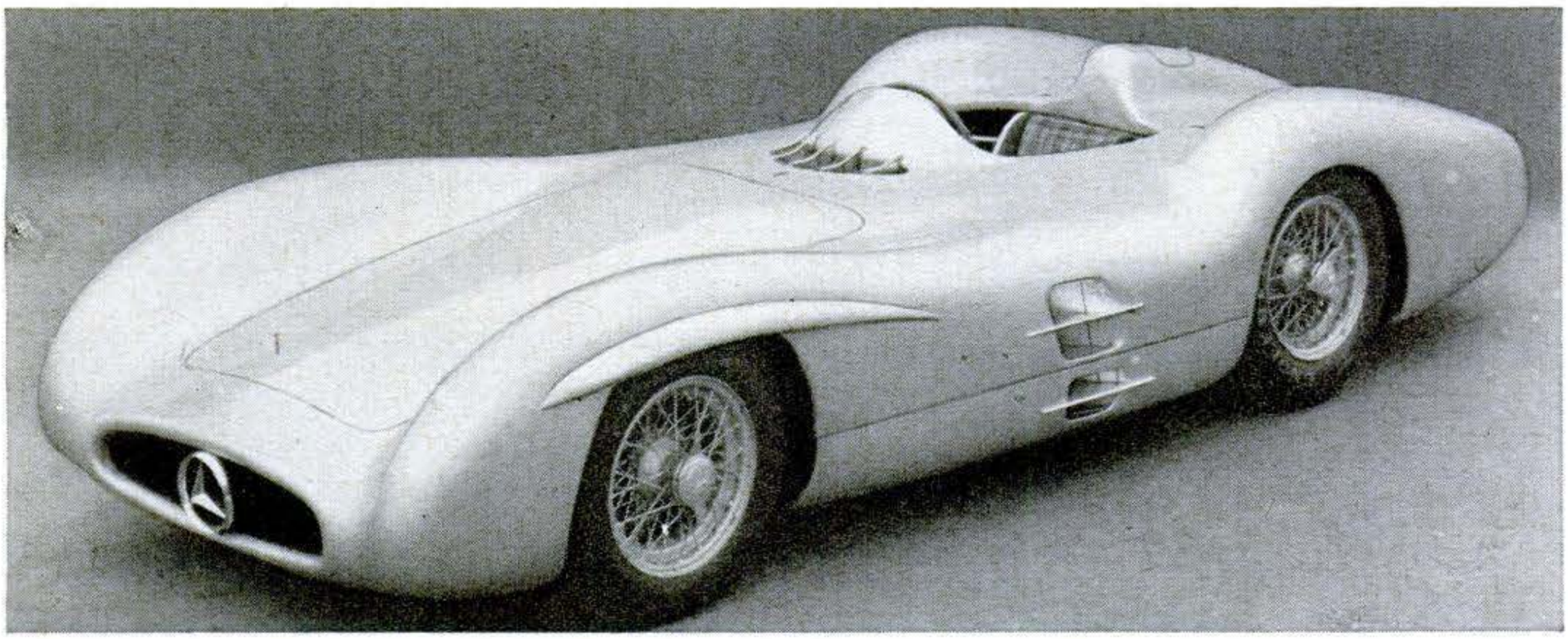
Copyrighted material

Wire and Math Make Big Globe Hold Together

PRINCETON architecture students call this weird globe a "discontinuous compression sphere." It is a 1:1,000,000 scale model of the earth, and is made of 90 aluminum pipes held together only by cable (see inset). No rigid part touches any other. Yes, it stayed up after the fire-truck ladder and scaffolding were removed.

The thing was planned by Buckminster Fuller, who has quite a reputation for unusual designs such as three-wheel cars, houses hung from poles, and big domes (like the Ford Rotunda in Dearborn, Mich.) that appear to be held up only by equations.





New Mercedes-Benz Is Designed for International Auto Races

GERMANY'S Mercedes, which in one model or another has been providing tough competition around the world-wide auto-race circuit, will put a new speedster on the tracks this summer. The low, sleek job pictured above is officially called the Mercedes-Benz 2.5-liter formula racing car. Note the complete lack of a windshield.

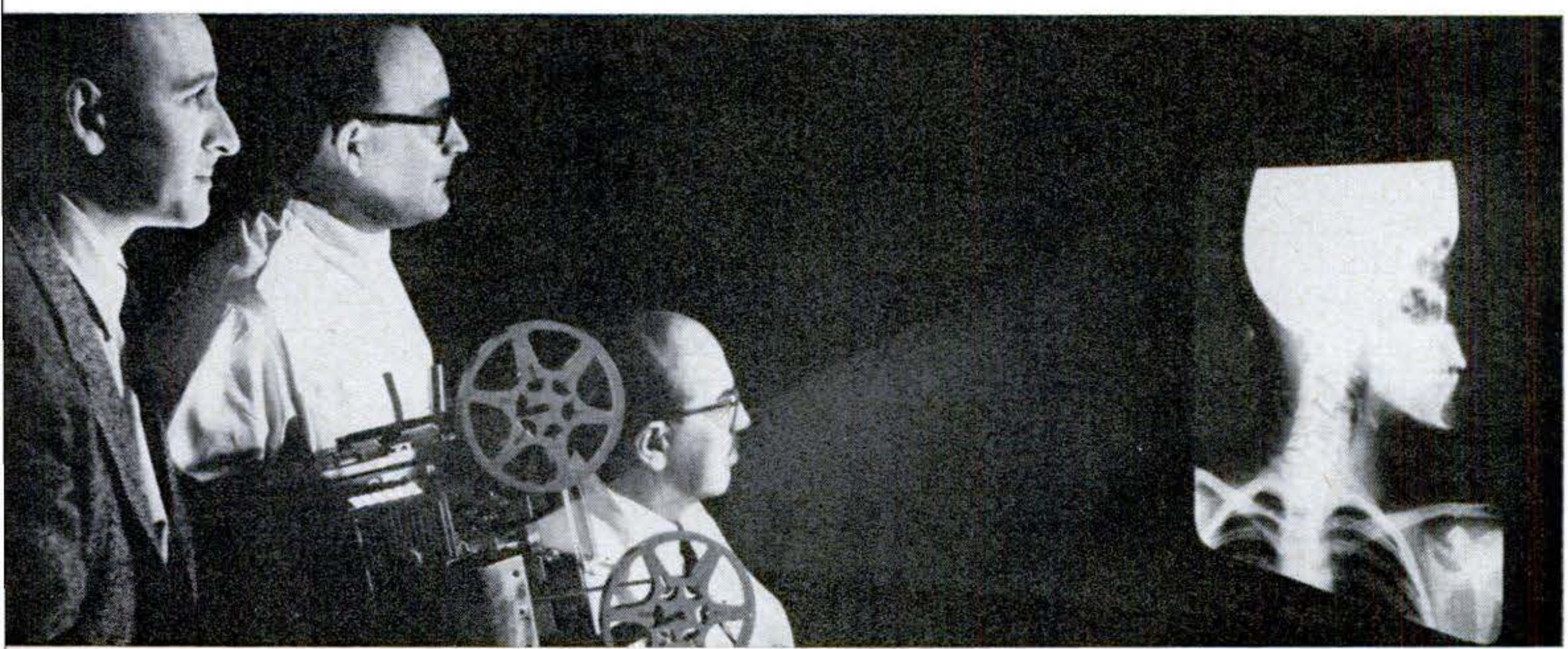
Copyrighted material

Street Heater Warms Bus Stop

WAITING for an omnibus on a cold corner (right) isn't so bad in the English city of Newcastle. Overhead radiant heaters now shed warmth in a wide area to keep the travelers comfortable. The experimental gas heaters are expected to lure out more shoppers on chilly days, and may even be used to warm up sports fans at stadiums and outdoor workers at building sites and shipyards.

Jet Torch Cleans Up Castings

THIS jet torch puts the heat on castings to melt away excess metal. Its 6,000-degree flame can clean up work in less than half the time it takes with pneumatic chipping guns. The tool is in use at the Reading, Pa., foundry of the American Chain & Cable Co.



Doctors Study Internal Organs with Slow-Motion X-Ray Movies

REGULAR X-ray movies can be made to travel in slow-motion by a trick projector. A five-bladed shutter permits the machine to run very slowly without flickering, slowing down movement on the screen to one-third its actual speed. The University of Rochester, which devised the machine, uses it to study the action of internal organs.

Copyrighted material

New Jersey Shows

How to Fight

The giant skeeters that once drove vacationers away from this state's resorts are now on the losing end of a 42-year battle.

By Gardner Soule

FINE PARALLEL LINES running inland from New Jersey seashore are 10-to-20-inch-wide mosquito ditches, 150 feet apart. About 7,000 miles of these canals drain mosquito-breeding marshes and serve as water highways for minnows that eat mosquito larvae. Right: female Jersey skeeter.

THIS month, New Jersey is throwing men, equipment and chemicals into its forty-second annual battle against mosquitoes. Longer than any other state, Jersey has been warring against the pesky varmints. It has accumulated, in that time, probably the biggest bag of anti-skeeter weapons.

The ocean, for instance. New Jersey lets the tides into her seashore salt marshes, in some places, so that mosquito larvae will be washed away to sea.

And fish. From its bays off the Atlantic, and from its tidewater rivers, New Jersey invites into its salt marshes millions of killifish, a kind of minnow, to consume mosquito larvae.

If you flew south over the Jersey coast, from Sandy Hook, at the mouth of the New York harbor, to Cape May, at the bottommost tip of Jersey, you would see a shore striped with straight lines running inland. These are 10-to-20-inch-wide canals, dug to the marshes from the sea to (1) drain the marshes and (2) serve as highways for the killifish. Via the canals, the fish can reach 300,000 acres of tidal meadows from which great flights of mosquitoes could menace half of New Jersey.

Forty Miles—Looking for You

In the salt marshes, New Jersey and the killifish are after the notorious Jersey skeeter. This creature grows as long as ⅝ of an inch, breeds in salt water and can fly 40 miles in search of a blood meal (i.e., you). And he is only one of 48 different mosquitoes in the state.

The Jersey skeeter, they tell you in the state, used to bite golfers; golfers shout when they're annoyed; and this led to Governor Woodrow Wilson's signing

Copyrighted material

Mosquitoes

the first mosquito-control bill in 1912. The war was on.

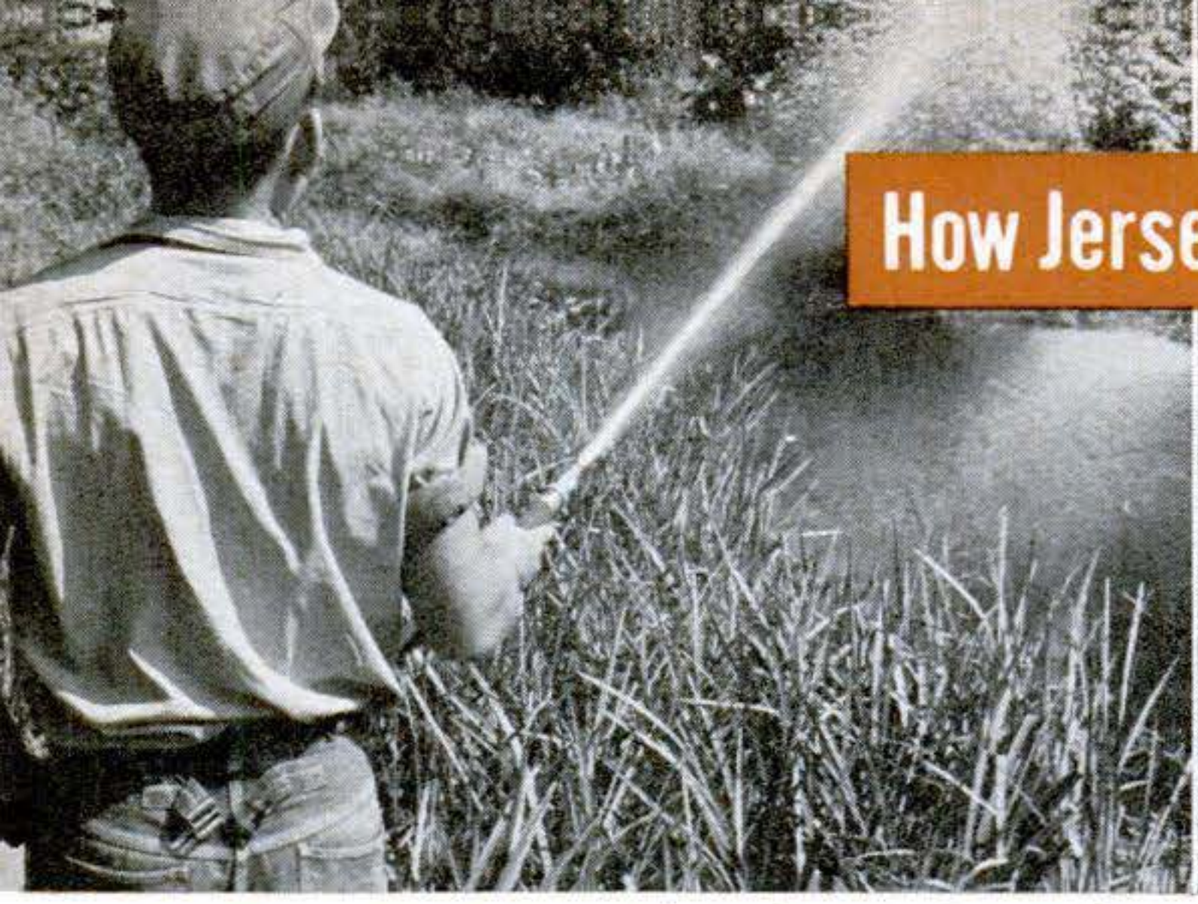
One year later, Fred A. Reiley enlisted in the Jersey army. Today, after 41 years, he's still in the mosquito war—as superintendent of the Atlantic County Mosquito Control Commission.

I asked Mr. Reiley what was new at the front. "Mosquito-control men," he replied, "have more heavy, mechanized equipment this year than ever before.

"There are," he said, "two related reasons for this: cost and speed. Labor went up. And cost per foot of a canal, or ditch, dug by hand has gone up accordingly. Hence machines, fast and cheap, now cut or clean out the long stretches of canal."

This year, Mr. Reiley's men are operating a big, tractor-like apparatus that will either dig ditches (75 feet a minute) or clean them. Designed by Mr. Reiley himself, it has long caterpillar treads to

Copyrighted material

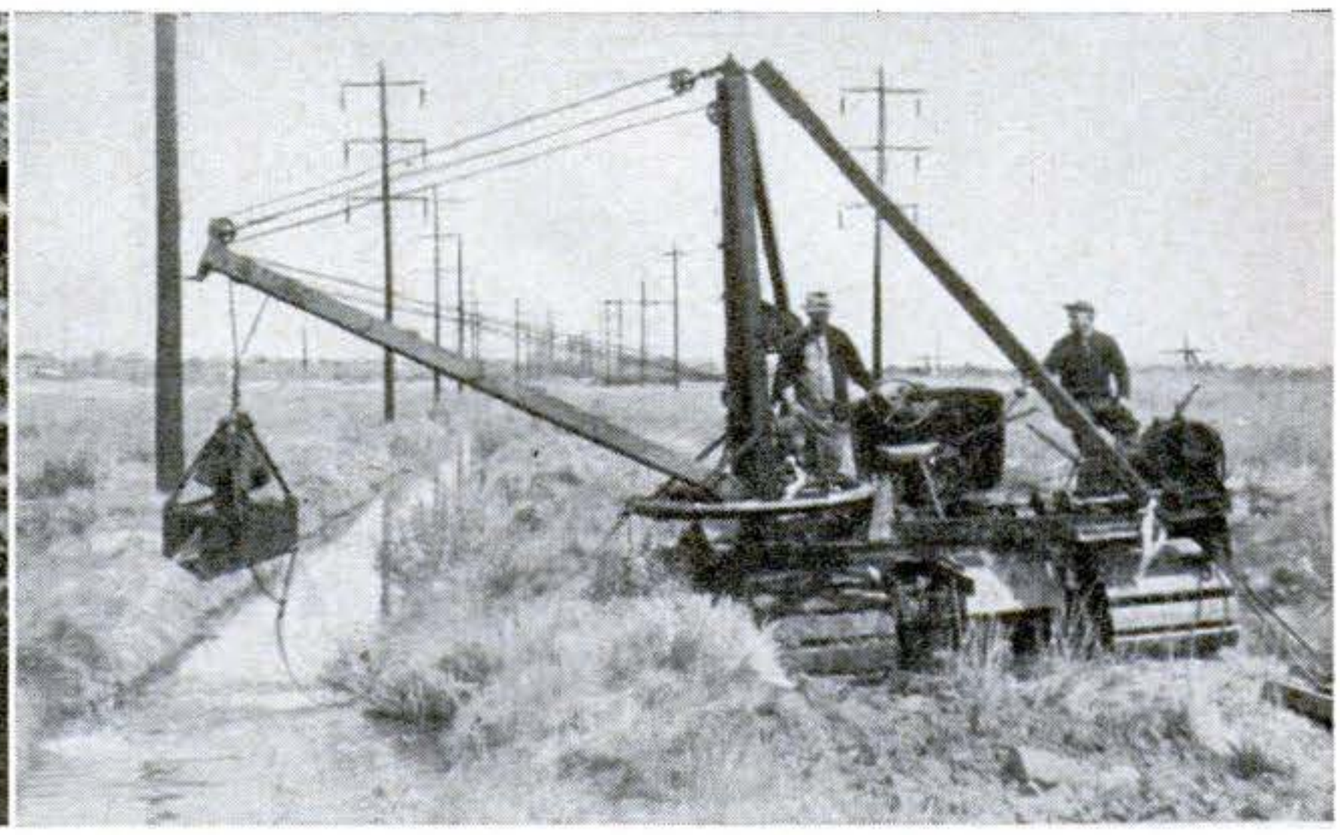


How Jersey Does It

POND is power-sprayed with pyrethrum larvicide. This chemical, developed by Rutgers University, kills mosquito larvae but does not harm fish, waterfowl, animals or vegetation.

WEED CRUSHER flattens tall growth so that otherwise inaccessible ditches can be cleaned out and area sprayed. Crushing of weed stalks prevents new growth from starting.

PAPER CUP containing dead mosquitoes is removed from a trap by a New Jersey resident. Insects from about 100 such traps are sent to Rutgers for identification and study.



CLAMSHELL BUCKET on a crane is used to recut and keep open the widest mosquito-control ditches. The ditches must be kept open for drainage, especially in flooded areas.

keep it from sinking into the marshes.

The machine is a far cry, Mr. Reiley recalled, from the tools he started with in 1913: spades. But the crew of today's Gargantuan ditch-digger-and-cleaner is exactly the same as the crew of a spade of 41 years ago: one man.

Modern Weapons for Mosquito War

New Jersey knows you can't solve a state's mosquito problem unless you have mosquito-control men in most counties, and it has them. It also has an impressive array of machinery ready to roll against the enemy:

Weed cutters. These are tractors with mowers in front that look like giant hedge trimmers.

Weed crushers. You can take an old Ford, put on wide rims and a caterpillar tread, and come up with this kind of a machine. In some sections of Jersey, you can't get into the meadows or marshes, or up to the ditches to clean them out, till the weeds are flattened.

Power sprayers for catch basins—those sewer openings at city street corners. These breed mosquitoes like fury. A new device is a right-hand-drive truck to carry the spray. The driver can spray without leaving his seat.

The scavel. This is a double moldboard plow, shaped like the inside of a ditch. With a tractor pushing, it can clean ditches at a rate of 125 feet a minute.

Trucks equipped with fogging apparatus. This lays a mosquito-killing mist

Copyrighted material

over part of a town, a home, a church, a picnic ground or a camp site, keeping down mosquitoes for up to 10 days.

Airplanes. Old, 90-mile-an-hour biplanes spread DDT and No. 2 fuel oil over the countryside. "We don't like speed when spraying," Mr. Reiley explains. "If a plane travels too fast, it's hard to control the spray."

Helicopters. The flying windmills can hover over and spray ponds, meadows or marshes surrounded by factories, high-tension wires and other obstacles.

Knapsack sprays. There are forests and marshlands that cannot be reached by heavy equipment. Jeeps, motorcycles, or feet carry back-pack mosquito men into such places.

"Hand grenades." When the mosquito fighters are in undergrowth that catches on knapsack equipment, they fall back on a "hand grenade." This is the "tossit," a kind of pellet that dissolves when thrown into water and shoots out DDT and oil. These substances float to the surface and kill mosquito larvae.

Dredges to widen and deepen river channels, thus providing drainage for mosquito-breeding areas back inshore. The dredges also fill in marshland, thereby eliminating mosquito-breeding spots.

Motorboats equipped with power sprays to squirt pyrethrum larvicide, a chemical that destroys mosquito larvae.

Pyrethrum larvicide was developed by the Agricultural Experiment Station at Rutgers University, New Brunswick, N. J., to kill mosquitoes without harm to other life.

Rutgers discovered, among other things, that the Jersey skeeter could fly 40 miles. I talked with Dr. Bailey B. Pepper and Daniel M. Jobbins at Rutgers and from them I got this picture of the mosquito tribe:

The mosquito is well adjusted to life on this earth. In millions of years, it has undergone almost no evolutionary changes, a fact demonstrated by fossils found in amber in the Baltic Sea region. The skeeter was, and is, one tough baby.

It will be the female that bites you. It always is. She needs protein to mature

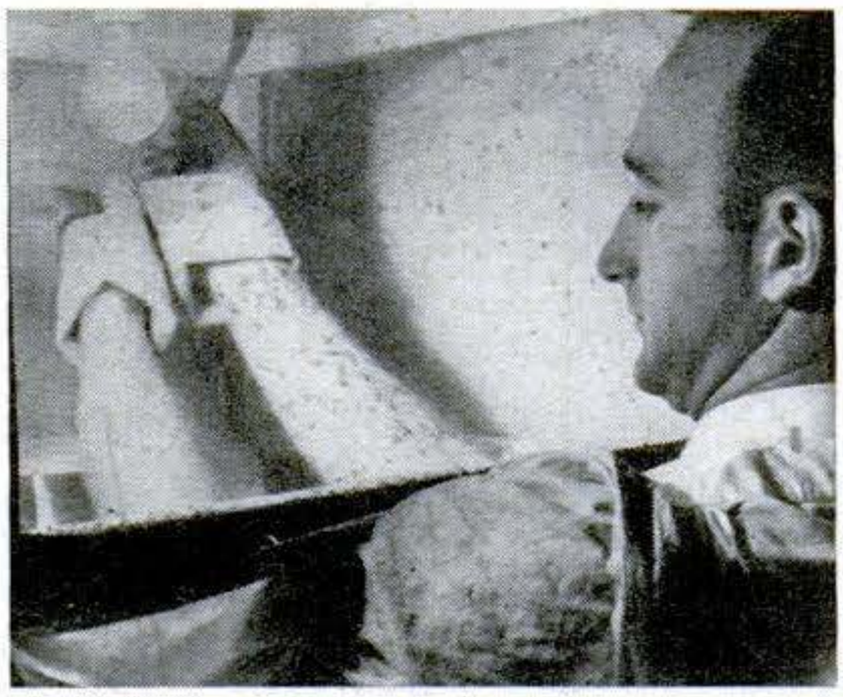
MOSQUITO CONTROL begins at home. This drawing shows some breeding places that can be eliminated. Where you must have standing water, change it at least twice a week.

Copyrighted material

her eggs; this means blood, and she will travel a long way to get it. Or she will fight to get it—if she is a house mosquito, she will put her head and leg into a screen and try to wriggle through. She may be a night-biter or a day-biter. She may give an alarm: a hum made by the beating of her wings. Or she may be absolutely silent.

She can live anywhere you can, does live in all 48 states. She gets blood from all domestic and many wild animals: from chickens, which she bites around the beak or on the legs; from snakes, which she bites around the head; from turtles, which she bites under the legs; and from humans.

She finds you infallibly. Science does not know exactly how, but does know that it has to do with following the trail of water vapor and carbon dioxide that you breathe or perspire out of your body. That trail is enough for the female to know wherever there is an active life process going on, and a blood meal to be had.



MOSQUITO REPELLENT is tested by a laboratory worker. Only his left arm has been treated. Note the mass of greedy mosquitoes, out for a quick bite, attacking untreated arm.

Male Mosquitoes Can't Bite

While the female is out for blood, the male lives on the nectar of flowers. He can't bite you; his proboscis, or beak, is not strong enough. But the female is trouble enough. To your dog, she can bring a fatal heart-worm disease; to your chickens, fowl pox; to you, stings and itches, malaria or encephalitis (which broke out in California in 1952).

There is one recruit the army of mosquito men would especially like to enroll: you. Both Dr. Pepper and Mr. Jobbins were definite. "Mosquitoes from one pail in your yard," says Dr. Pepper, "can annoy the whole neighborhood."

Against mosquitoes live and coming at you, four steps are recommended: Spray indoors with DDT or other fly sprays. Be sure that your screens have 16 meshes to the inch (the standard U. S. screen). Check to see that your screens fit tightly. And use repellents on exposed parts of your body when you go outdoors.

The Good Old Days—for Skeeters

Have the methods used in New Jersey really worked? When the mosquito men first got busy, 42 years ago, the standard summer attire of a man outdoors included a broad-brimmed straw hat with mosquito netting from the top of the hat down to around the neck. Fishermen wore boots or newspapers around their legs as partial armor. People slept under mosquito nets at night. Some hotels closed because hordes of mosquitoes chased away guests. There were countless cases of malaria.

"I have seen mosquitoes so thick right here in Atlantic City," said Mr. Reiley, "that 500 feet away you couldn't tell Tom from Dick. You could see the form, but that was all."

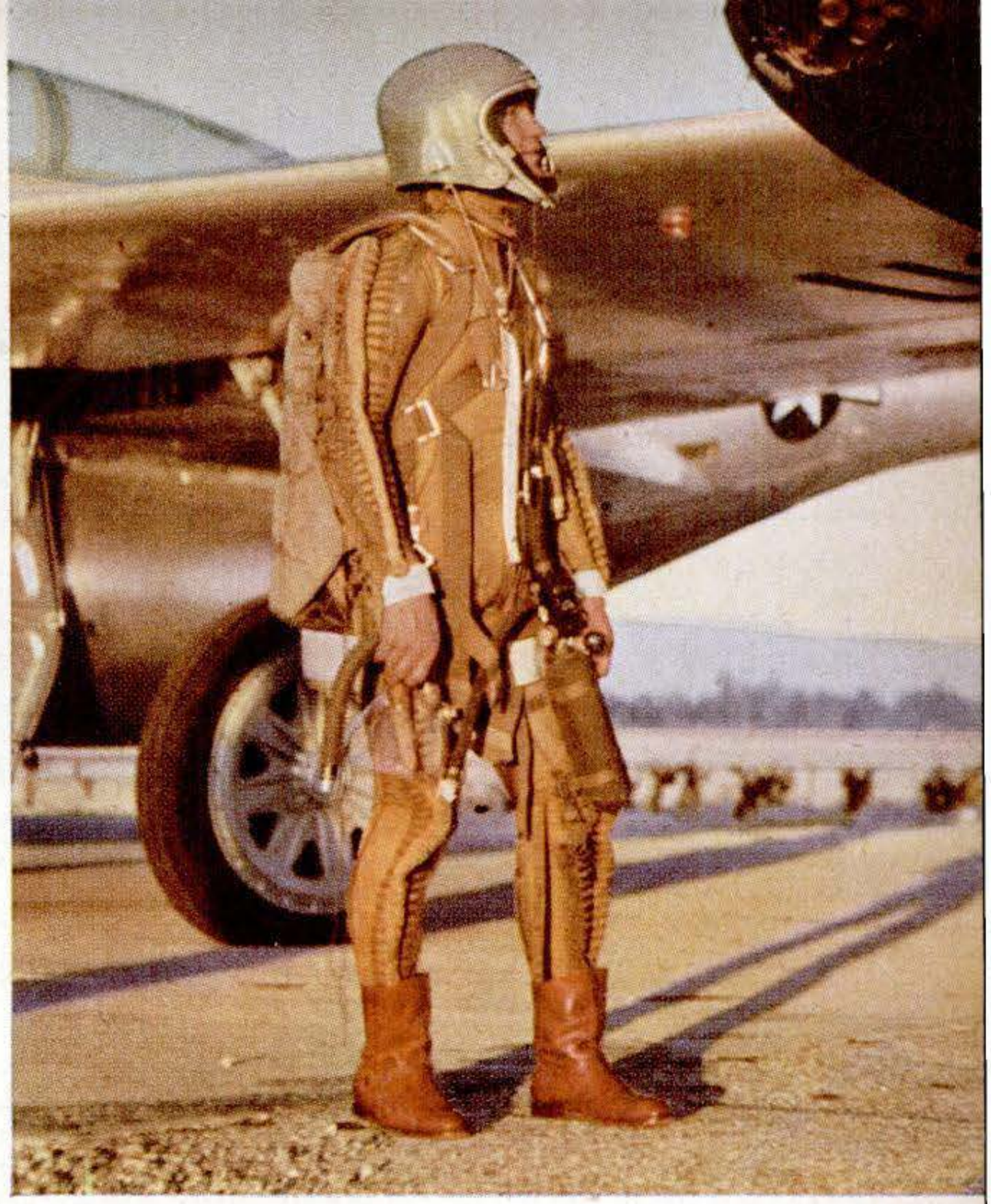
Today all this is ended. There is no malaria except imported, spotted in a few returning servicemen. The mosquito-control men have made habitable large areas of Jersey that formerly were plagued with the pests.

They have followed the paths pioneered by Walter Reed and W. C. Gorgas, who freed Havana and the Panama Canal Zone from yellow fever and malaria by conquering the mosquitoes.

If you stop to think, you will, I believe, be able to picture some definite evidence of the success of the Jersey skeeter killers. You've seen photographs of bathing girls at Atlantic City during the mosquito season. They show quite clearly that the girls on New Jersey beaches no longer find it necessary to cover up against mosquitoes. END

Copyrighted material

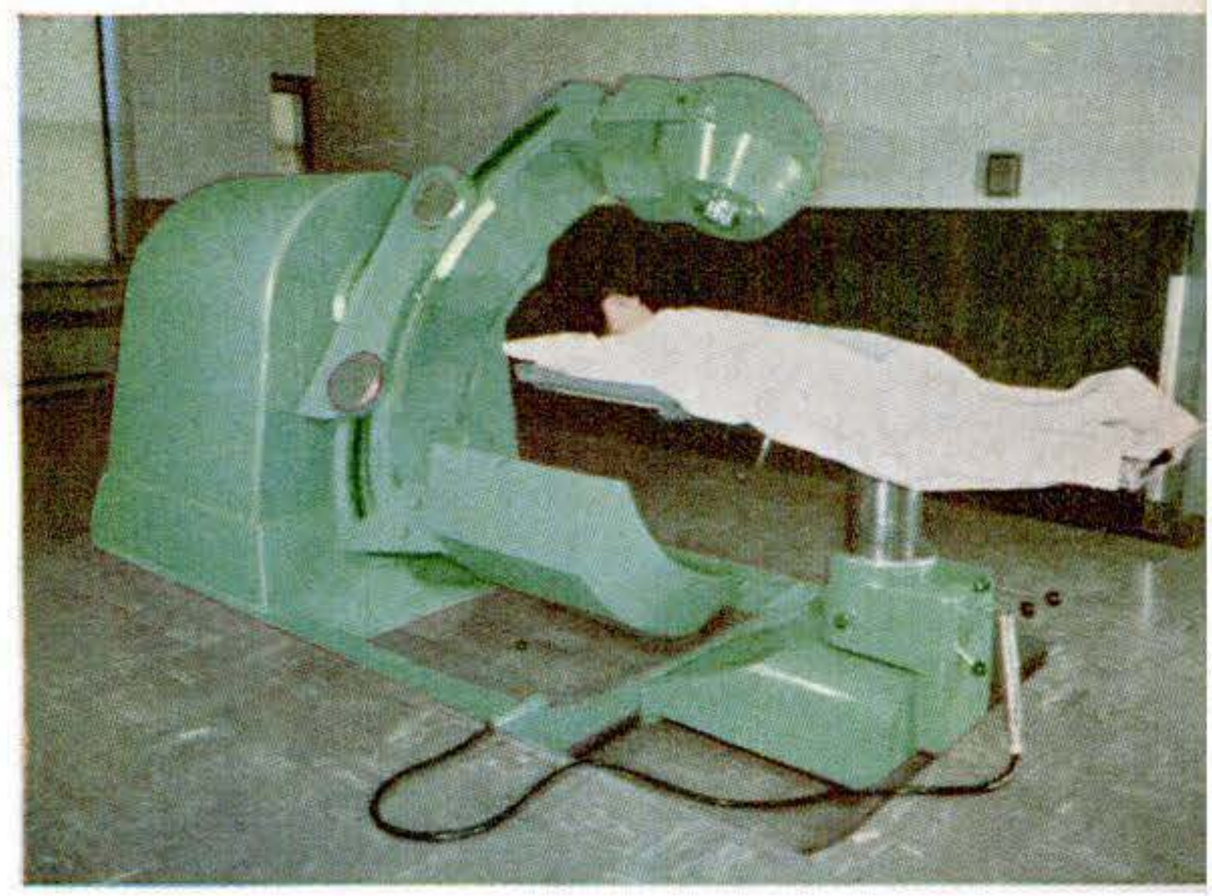
Aluminum armor and a sword made of plastic equip modern Galahads to battle spacemen. Knight's gear, imported from Italy by the J. J. Sales Corp., 1123 Broadway, NYC, can be substituted for an old sauce-pan helmet and a stick disguised as a sword.



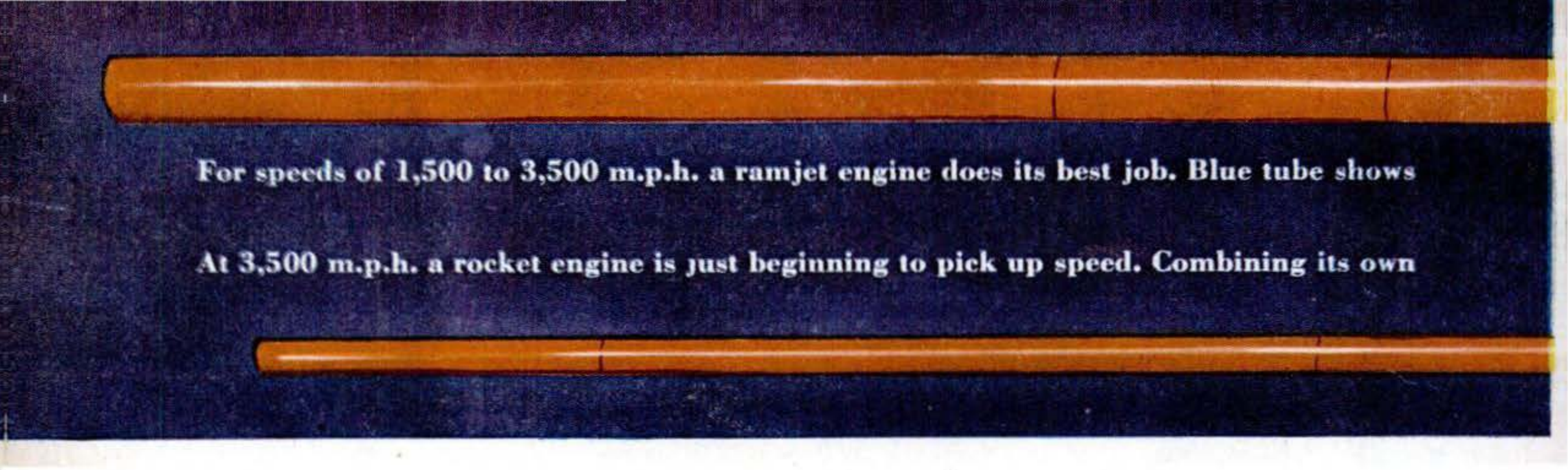
Tailor-Made to follow the pilot's body contours, this pressurized outfit is worn by test pilots flying Northrop Scorpions. It prevents their blacking out from thin air or from sharp turns.

Thickest Douglas Fir ever felled by man is this giant, 12¾ feet in diameter. It took three men with a power saw a day and a half to cut it down. The annual rings on the fir tree revealed that it stood 586 years before it heard the loggers yell, "Timber!"

Cancer Trap: One steel jaw below holds a slug of radioactive cobalt. The other is a counterweight. They spin around to avoid burning normal tissues near a cancer during treatment at Francis Delafield Hospital, New York.



Copyrighted material

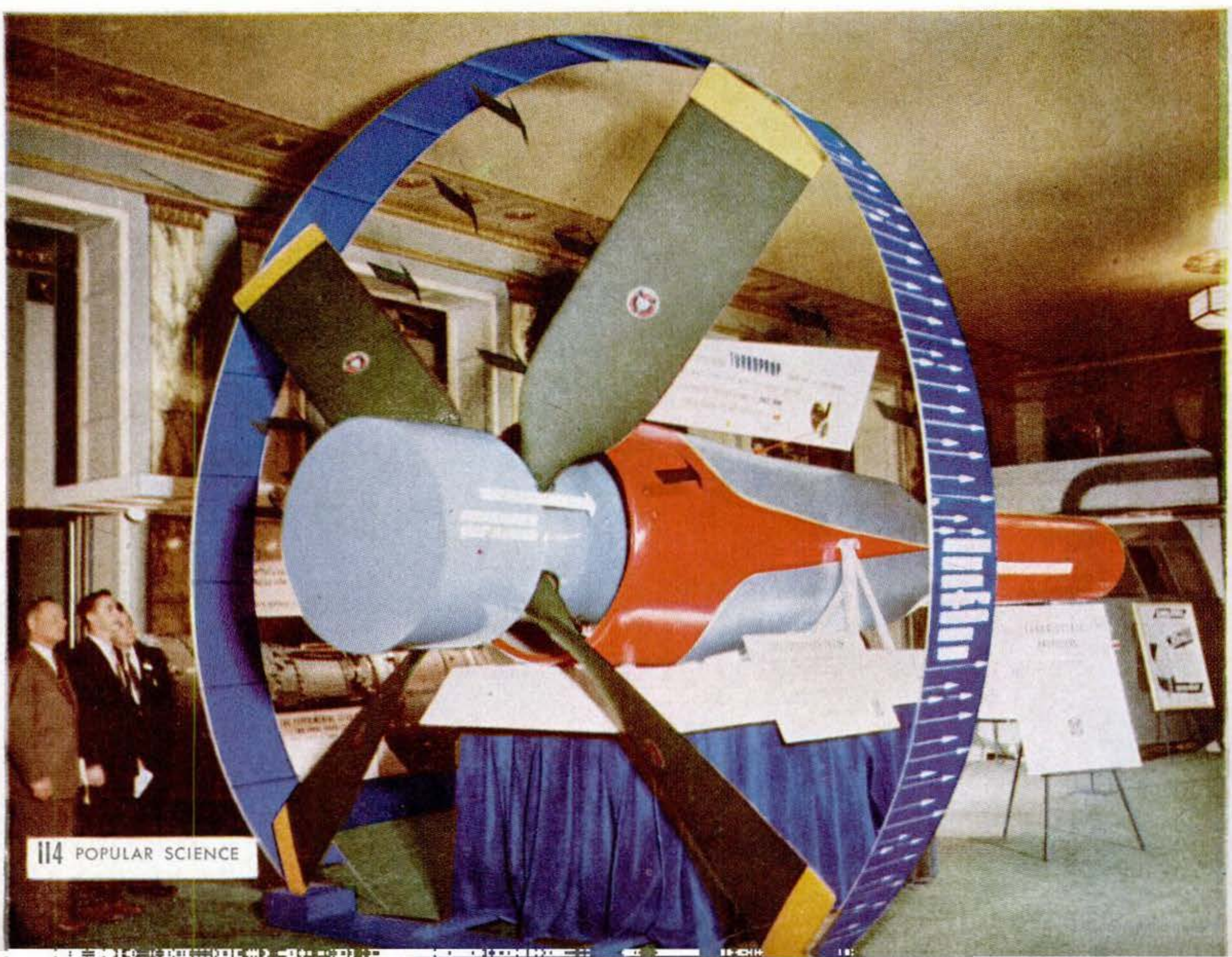


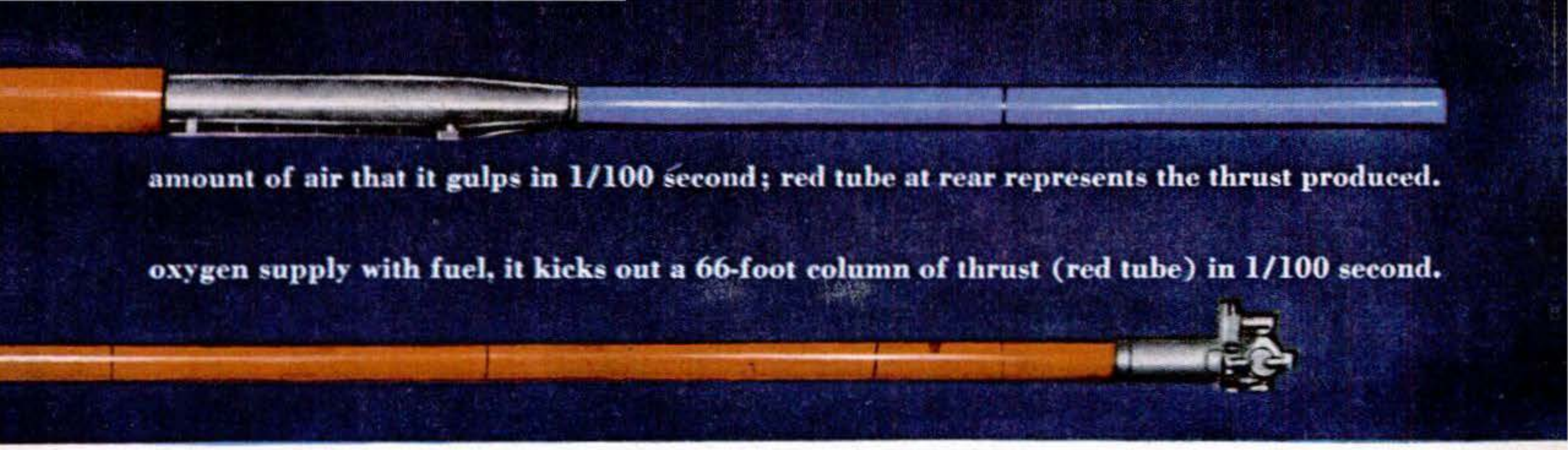
Engines You'll Still See in 1964

THE engines that Curtiss-Wright engineers expect to write the next 10 years of aviation history were exhibited recently in New York. Blue tubes were attached to them to show how much air they consume per 1/100 of a second, and red tubes to show the thrust they produce. These pictures, taken specially for POPULAR SCIENCE MONTHLY, show you how greatly the engines designed for very fast flight differ from those that are more efficient at slower speeds.

You may have ridden already in a commercial airliner powered by the turbo compound. Whereas the rocket above uses half a pint of fuel and oxidizer in 1/100 of a second, the bigger turbo compound uses less than half an ounce!

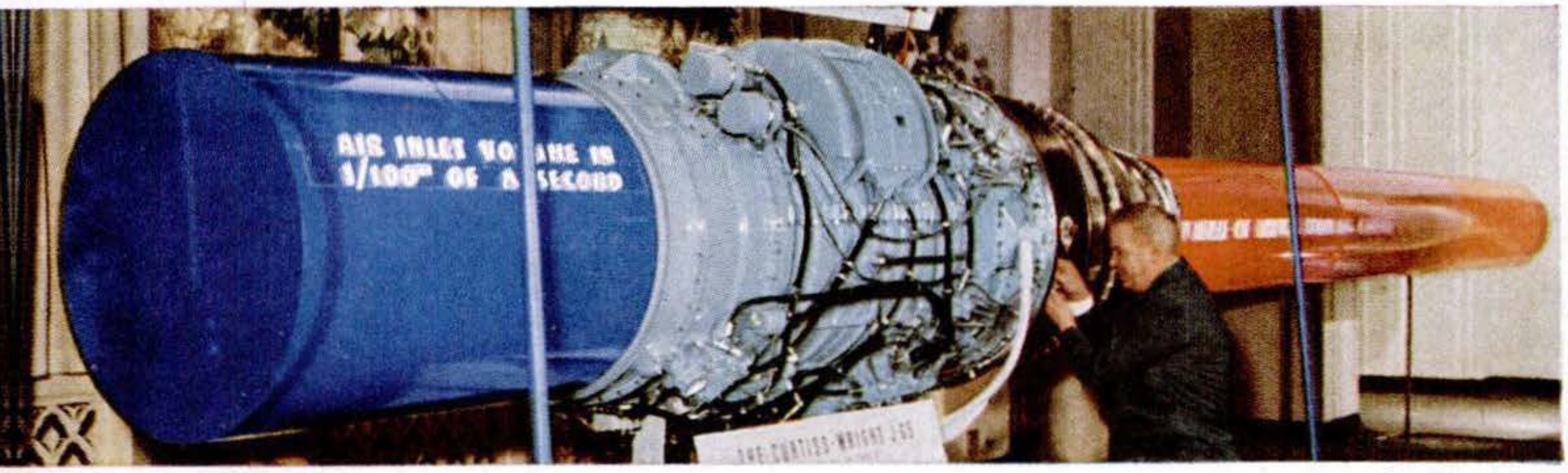
TURBOPROP is for long, nonstop transport flights at 500 to 800 m.p.h.; four-fifths of power in exhaust is used to help drive the propeller; the rest contributes to engine's output through jet reaction. Red tube shows importance of the fifth devoted to thrust.





amount of air that it gulps in 1/100 second; red tube at rear represents the thrust produced.

oxygen supply with fuel, it kicks out a 66-foot column of thrust (red tube) in 1/100 second.

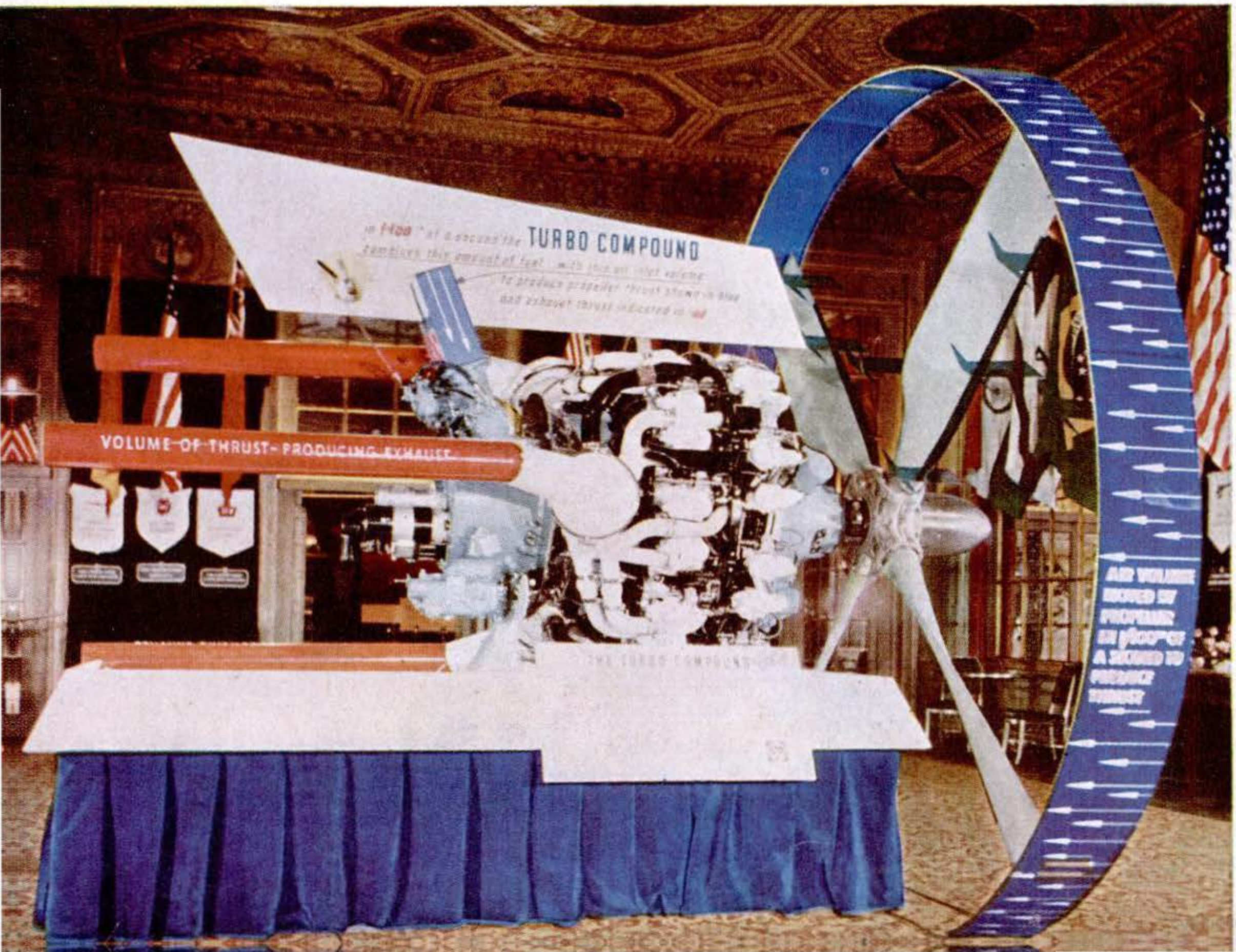


TURBOJET, used in military planes now, is most efficient when it's going from 800 to 1,500 m.p.h. and flying at high altitudes.

TURBO COMPOUND, used now on DC-7's and Super Constellations, is more efficient than turbojet or turboprop below the sonic barrier.

When turbojet planes fly more slowly at low altitudes, they are not as efficient as the propellered engines pictured below.

It is expected to raise transport plane speeds above 400 m.p.h. Turbines recover energy in exhaust, apply it to the prop. END



A caravan of new trailers heads west.

Look What's

Push back that sliding panel in the ceiling and light floods in through a plastic bubble.

All the comforts of home are right at hand.

A typical trailer park has a permanent look.

Copyrighted material

Happened to Trailers

They have settled down to the soft life, as the majority of the 1,700,000 Americans who live in them give up vagabonding.

By Kenneth Wylie

TRAILERING has changed. The bare, utilitarian shelters on wheels once favored by vacationers, and campers and other outdoors people, are largely things of the past.

Today's trailers are big and fancy, and a lot of them—a good 50 percent—are not being pulled any more by Pa at the wheel of the family car. When they are pulled at all, which is rarely, they are pulled by trucks, specially sawed off for the job. Quite a few of the nation's 740,000 trailers are just sitting in parks now, many of them up on blocks, their wheels either in storage or sent back to the manufacturer on a trade-in. There is a campaign under way to call these trailers "mobile homes."

Trailerites have become sluggish. A recent survey showed that the typical coach is moved only once a year. The average move is 200 miles.

In 1937, when trailer sales came to $17,000,000, vacationers paid out a total of $8,500,000 for their share.

In 1953, when trailer sales swelled to $330,000,000, vacationers bought only $2,000,000 worth. Their slice of the total had slumped from 50 percent to less than one percent.

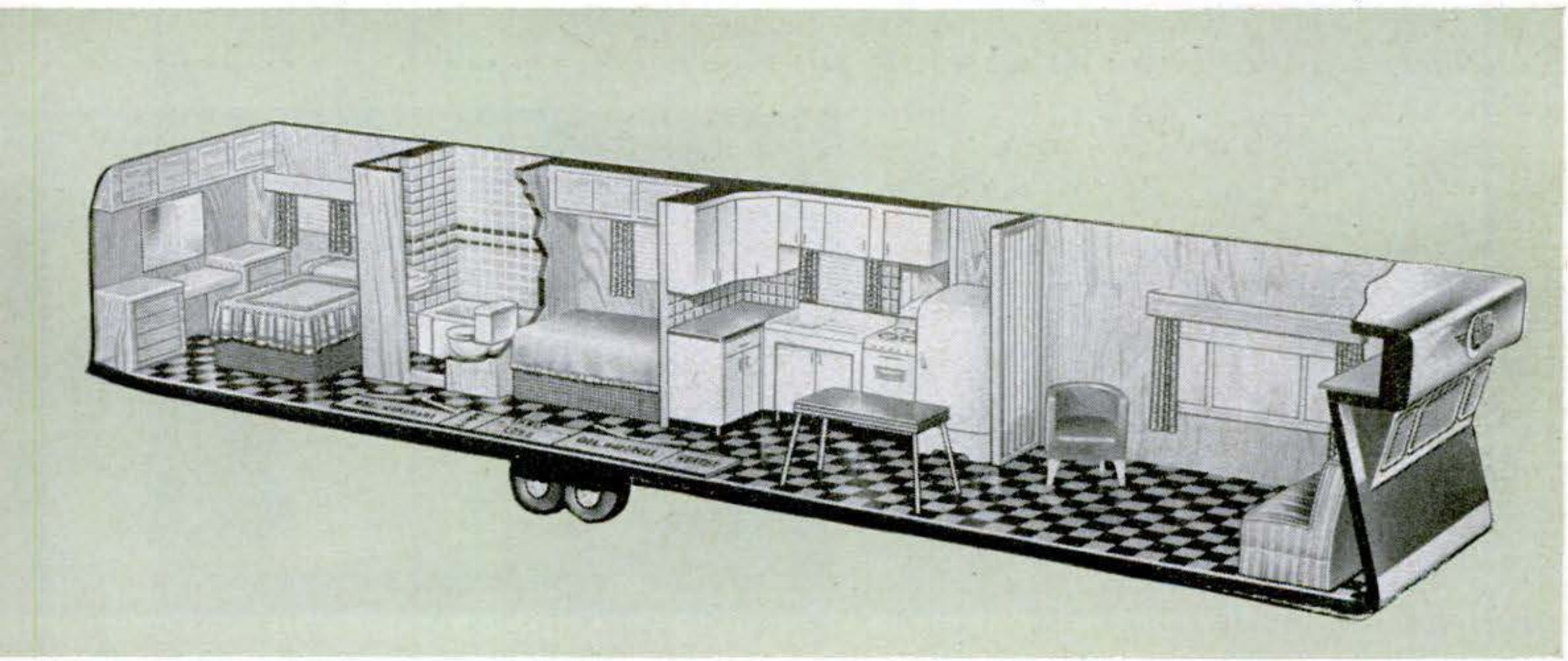
Inside a Mobile Five-Room Home

Today, between 80 and 90 percent of the country's 1,700,000 or more trailerites list their mobile homes as permanent addresses.

And what homes they are! Typical models have all-metal skin and five rooms within. Living quarters include two closed bedrooms, with closets; dinette; kitchen, with standard-size gas range, electric refrigerator and two-basin sink; large living room; and bathroom, with toilet, washbowl, tub and shower. The plumbing is usually triple-trapped.

Space, naturally, is the No. 1 problem

This 45-foot, two-bedroom mobile home has four closets, an all-metal kitchen, 18 windows.



Copyrighted material

in trailer design. Builders have sidled around this in varying ways.

One coach has a main, transverse partition fitted on rollers in tracks. When it is getting late and you want to shut Uncle Ev off in the corner with his cigars and magazines so that you can go to bed, just nudge the wall—and presto, he's boxed in.

Push-Button Room

Another model has a retractable alcove section, which pops out to one side for added space once you are off the road and anchored in a park. When you are ready to move on you pull it back in and your trailer is its old, slim self again.

Quite a few mobile homes have camel-like humps topside that house second-story bedrooms. These are sometimes reached by stairs, sometimes by ladders.

As in orthodox cities, there are skyscrapers in trailer-town housing. One huge model has telescoping walls, made of metal clapboard and fitted with shutters. Electric motors and hydraulic pumps lift the outer walls up to second-story height, and a little housework inside lays out floor and ceiling. The result is a Georgian Colonial, two-story house, with stairs up the outside to the upper floor.

The giant of them all is a 65-foot, articulated tractor trailer (PSM, Feb. '53, p. 166), priced at just $75,000. For this you get, among a host of superlatives, a combination sun deck and helicopter-landing platform, portable swimming pool, wine cellar and three elephant guns.

The giant, two-story trailers with all the gimcracks are, of course, exceptions. But the completeness of the equipment of standard trailers is their biggest appeal. Manufacturers claim that this feature sells many buyers on a mobile home in place of a dull, ordinary house on a foundation.

Heating and ventilating long were bugaboos to both trailer makers and owners. New heaters and closet-enclosed trailer furnaces have changed all this. Fired by oil or the same propane or butane used in trailer stoves and refrigerators, they send out enough hot air through ducts to warm the coldest feet. Forced-air fans speed up the warming process or, during mild weather, bring in cool night air through wall or roof vents. In hot weather, a trailer air conditioner will cool the place off in no time, and keep it dry, too.

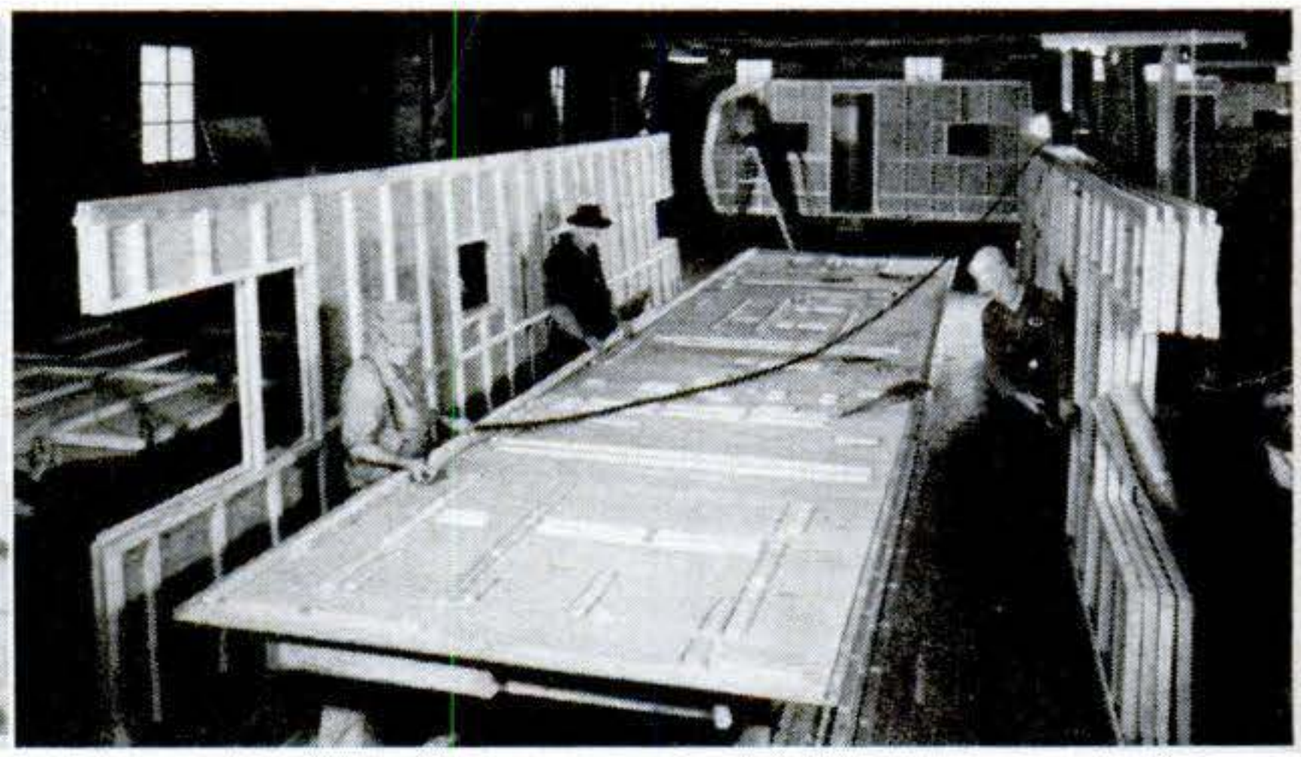
Steel Trusses for That "Dachshund" Sag

Highway regulations hem in trailer height and width to 14 by eight feet in most states, though Arizona, Connecticut and Rhode Island let them spread to eight and half feet. To expand, trailers have had to grow dachshund-style—longer and longer. This has involved, as the little German dogs know so well, problems of sag and creak.

Trailer frames, accordingly, are steel trusses. Most of their load stress is thrown

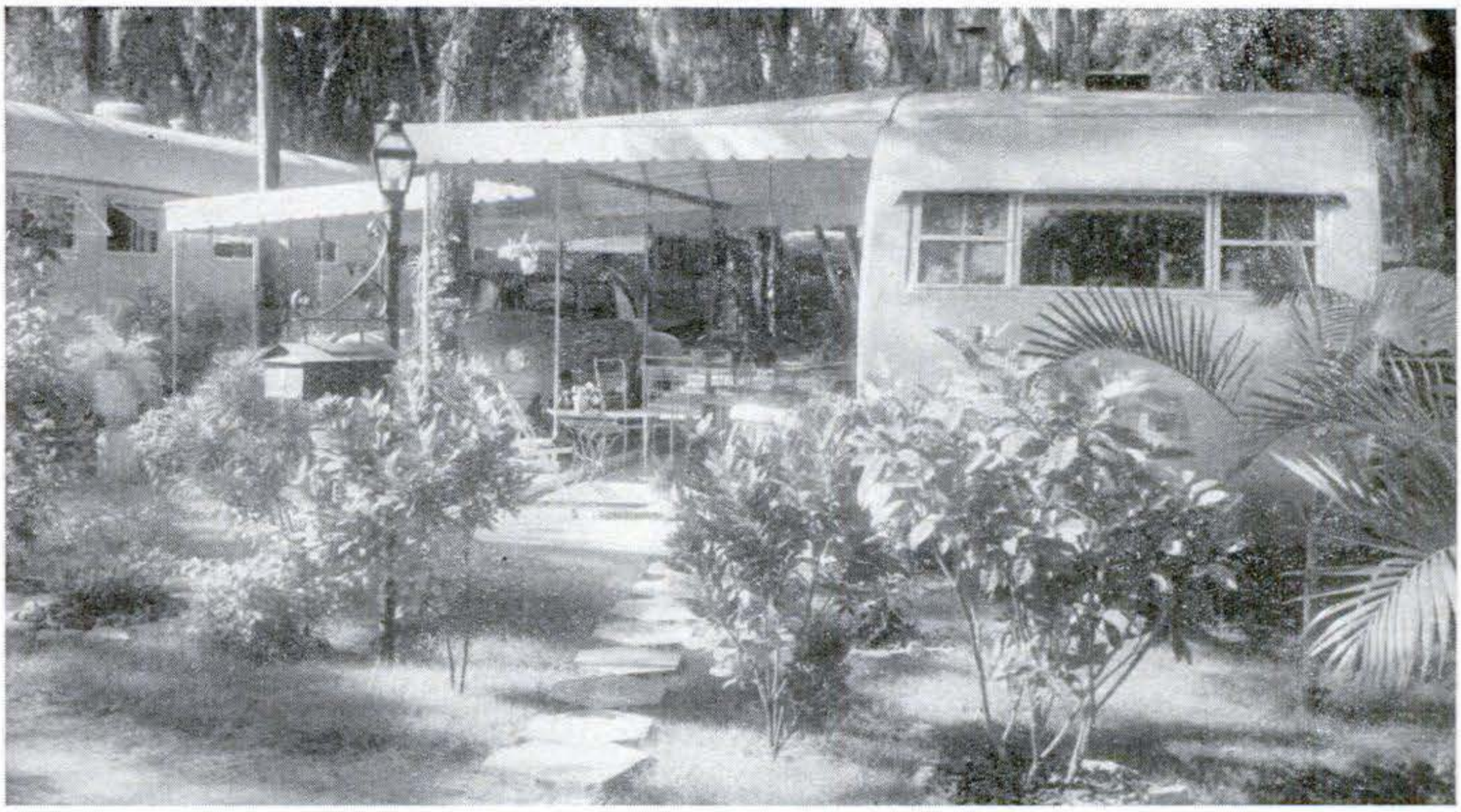
Somebody's future home on wheels is put together

STEEL UNDERPINNING of a wood-framed coach is hoisted to a second-floor production line.



WOODEN JIGS guide workmen building its sides. Finished walls stand around the shop.

Copyrighted material



Done with roaming, the owners of this trailer have added a carport, porch, landscaping.

at points above wheels and suspension points. To prevent sag, they may either be preloaded or built with as much as three inches reverse camber. When the sides, also load-bearing trusses, are built on, the frame flattens out.

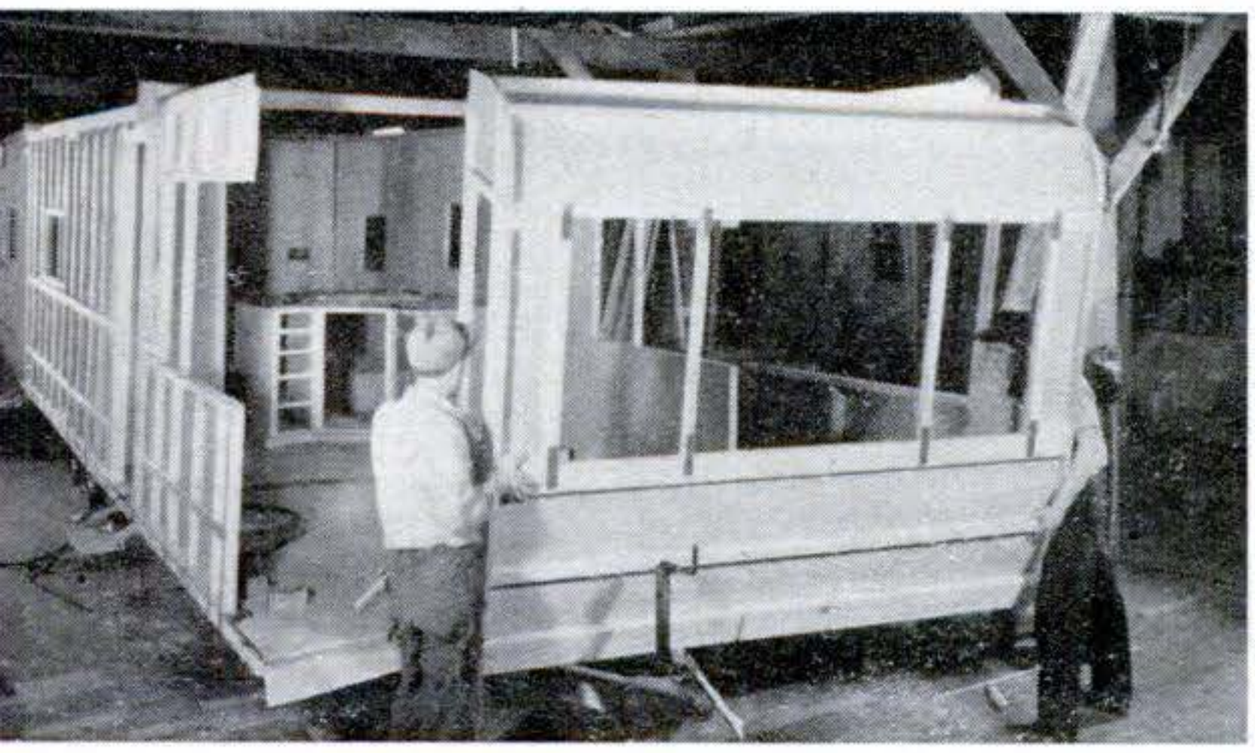
Manufacturers Play No Favorites

Nailed-wood, steel or aluminum frames are most common for trailer bodies. Trailer skins have been made out of just about everything that can be cut into panels and hung on a frame. Even canvas, stretched taut as a drumhead over frame beams, has had its play. Aluminum, sheet steel, composition board and insulating board have proved to be about the best.

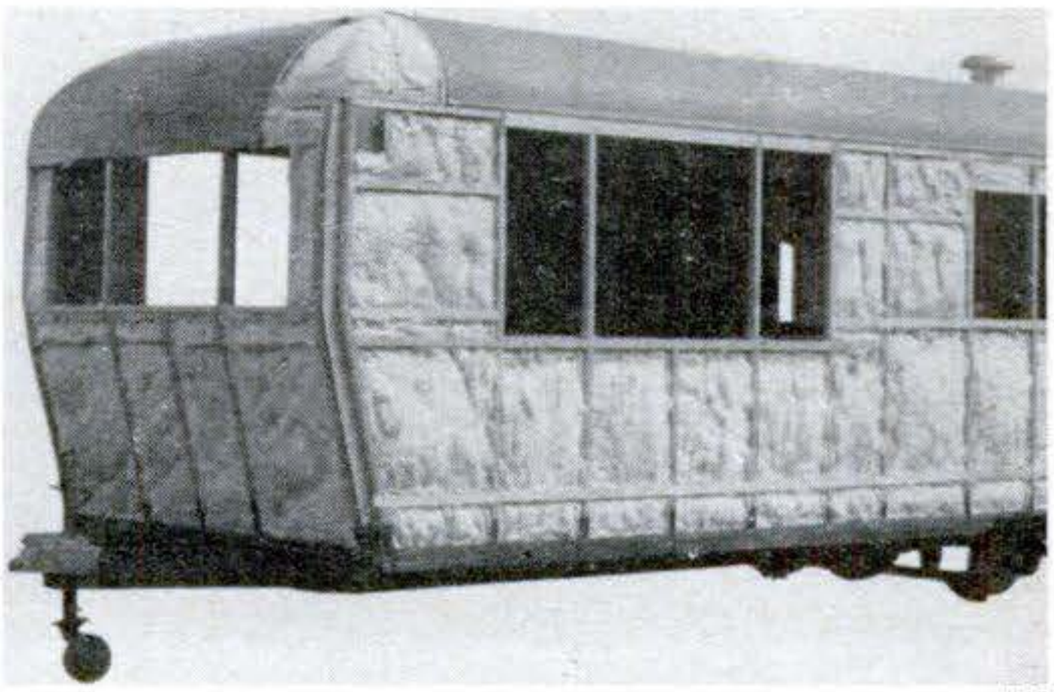
Probably the first vehicle approaching today's trailer was a house car built in 1920. Sixteen feet from front to back, it had a double bed over the hood, another at the rear, and cooking and eating areas between.

Today, 75 percent of all new trailers are in the 30-foot class or longer. Most stretch between 16 feet and 40, with a few running to 45 or 48 feet. Longer models are custom-built.

The standard price spread is from about $1,600 to $5,000. If you like, of course, you can knock out the eyes of

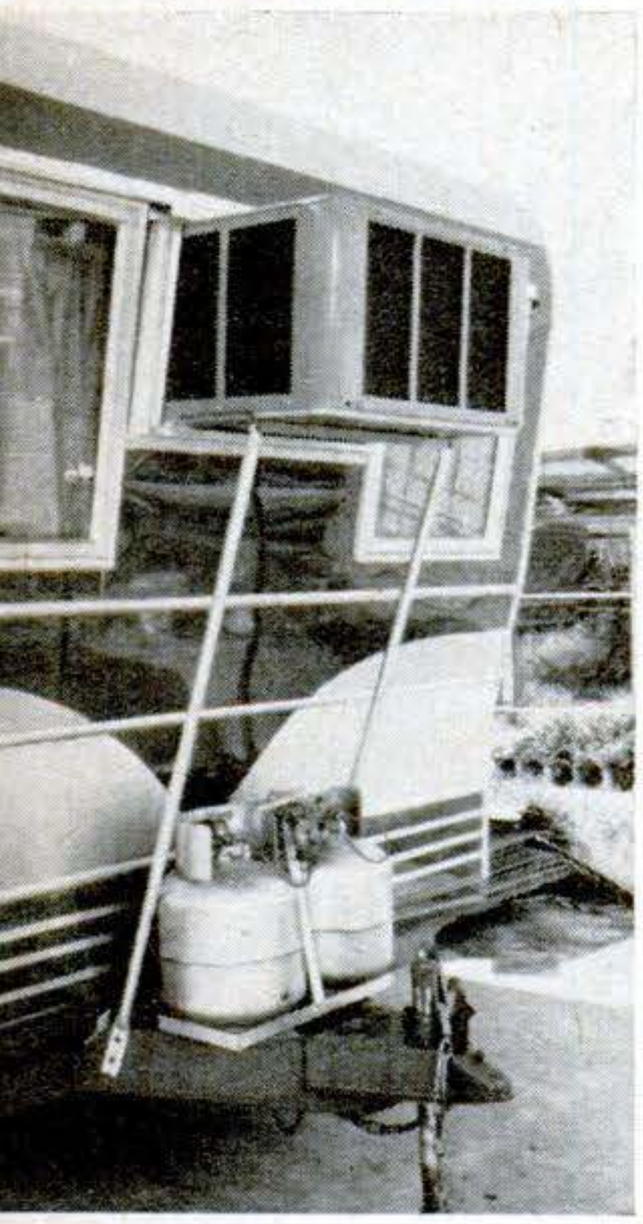


SIDES AND ENDS are nailed together. Cabinets will be fastened down when the roof goes on.



LOTS OF INSULATION and moistureproof paper are put in walls. Roofs are often aluminum.

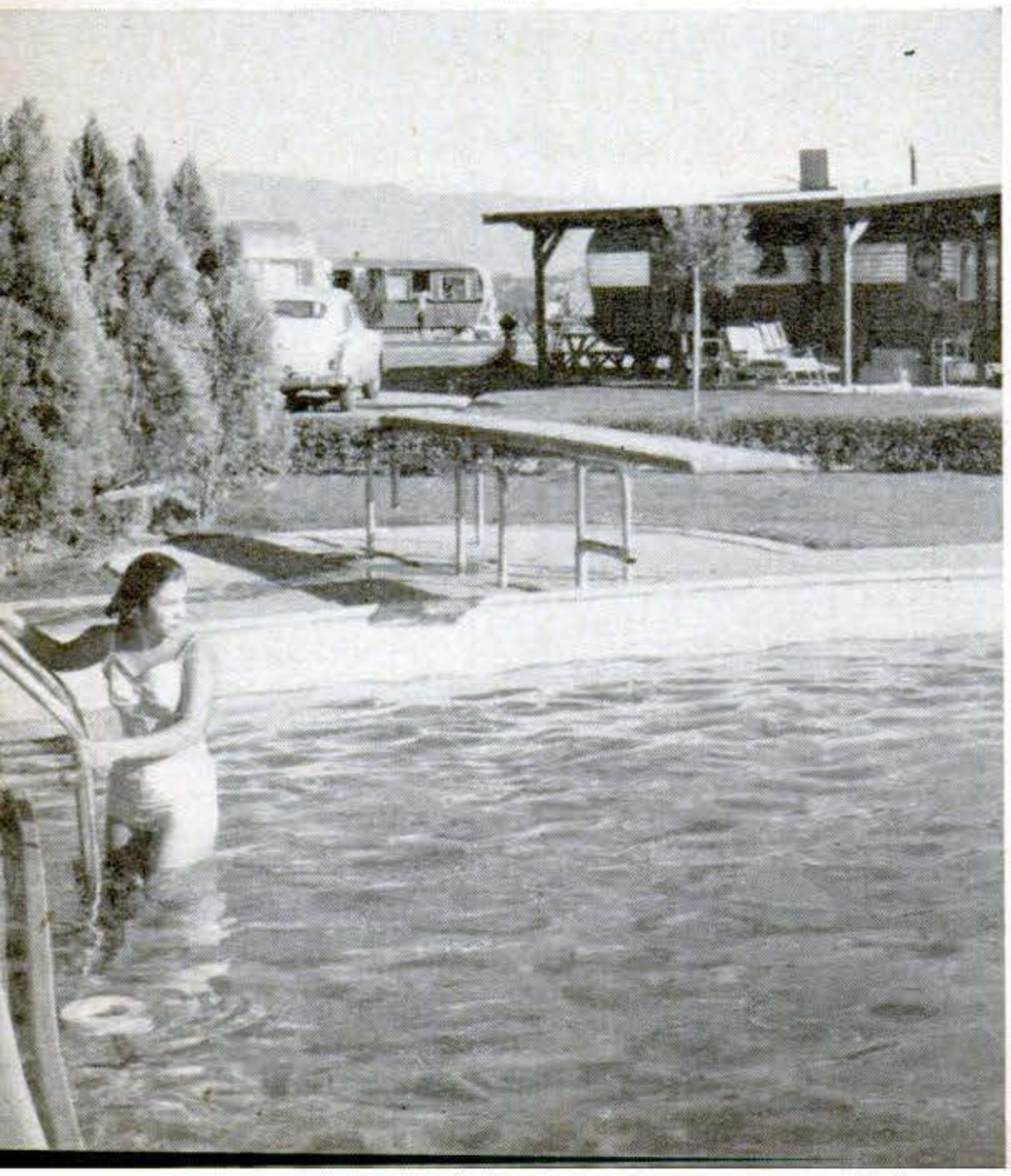
Copyrighted material



FIREPLACES, fitted with gas logs, lend special charm to the most lavish trailers. Some also have big refrigerators, freezer cabinets and even barbecue pits.

AIR CONDITIONERS are almost a must down South. They are usually bolted outside a window, roof-mounted, or housed in cabinets that match the furniture.

SWIMMING POOLS are not common in trailer parks, but they bring a touch of swank to some out West, where the pool has special social significance.



the rest of the trailer park with a palatial model, starting at $14,000.

What the mobile-homes industry now refers to as a "travel trailer," and what you may still simply call a trailer, is purchased today largely by the younger and hardier folks.

While the mobile-home dweller, jaded with his easy life in a movable apartment, might find traveling in one of these 12- to 22-foot coaches a Spartan life, the new ones are just as ruggedly and nicely made as his big model. They do lack the wall-to-wall carpeting, flush toilets and garbage grinders that come with the luxury sizes. But they have stoves, refrigerators, heaters, beds, washbowls or sinks, and sometimes baths.

Small Jobs Mean Easier Pulling

Don't forget that when you give up the special delights of the over-30-footers, you are getting rid of pounds, too. A 12-foot trailer weighs in at about 1,400 pounds; 22-foot models run about 3,400 pounds. That adds up to lots easier pulling.

For the most part, you use community bathhouses and laundries when traveling in one of the smaller trailers. There are plenty of these facilities in the national parks and some in state parks, too.

When you get in the fancy, over-22-foot bracket, though, it's the trailer parks for you. They charge anywhere from about $12 to $40 a month, with the average rental between $15 and $25. Transients get by for $1 a night in most places, and there are reduced rates for servicemen in many parks.

For your money, you get such things as cement patios beside each trailer lot, street signs and street lamps, playgrounds for the children, TV lounges for the whole family, recreation areas for grownups, and regular deliveries of bottled gas, baked goods, milk and maybe brushes, too. Mail service of some kind is always available.

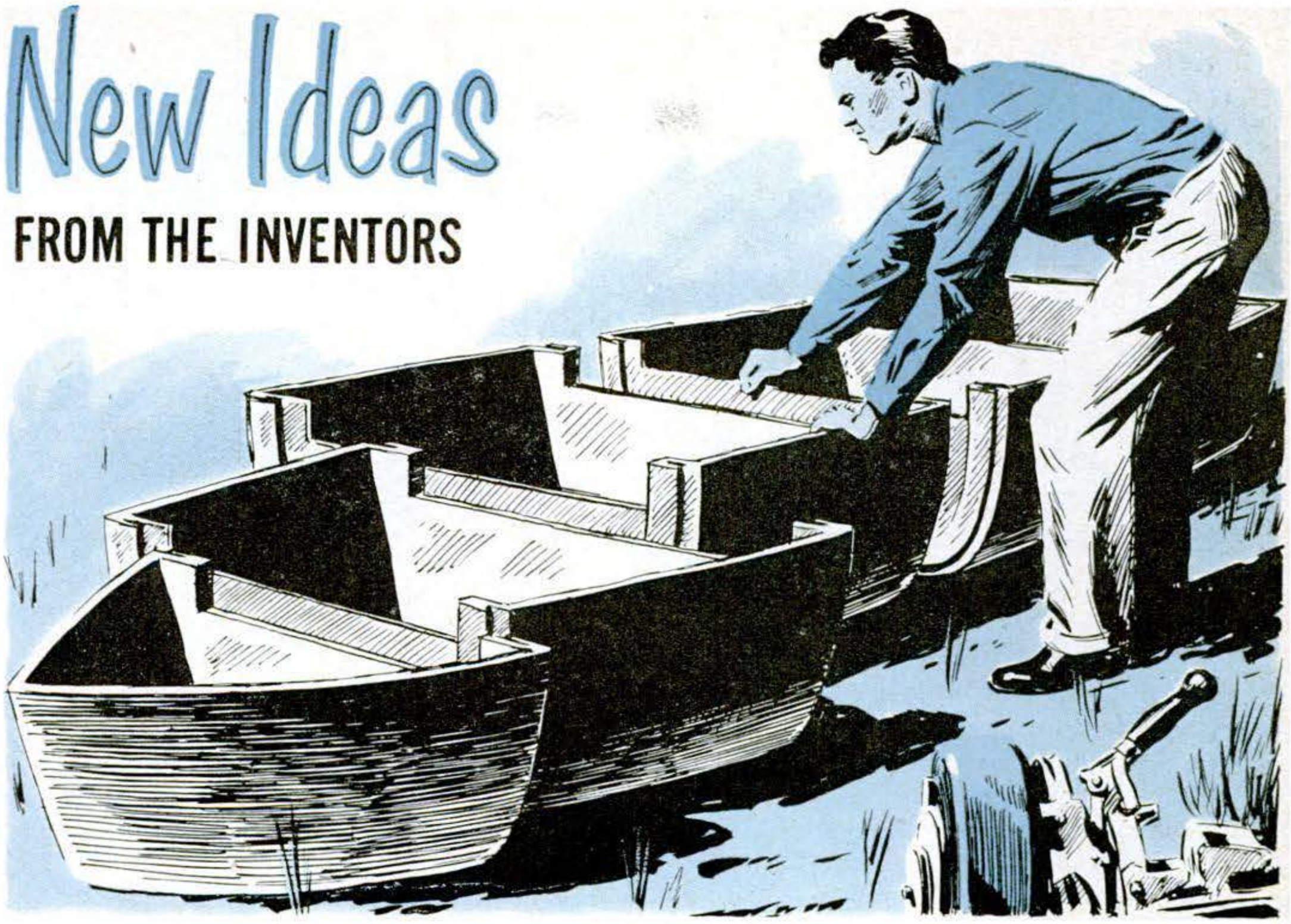
Each trailer connects to the park's water, sewage and power lines. Garbage is picked up regularly. Some parks have

[Continued on page 250]

Copyrighted material

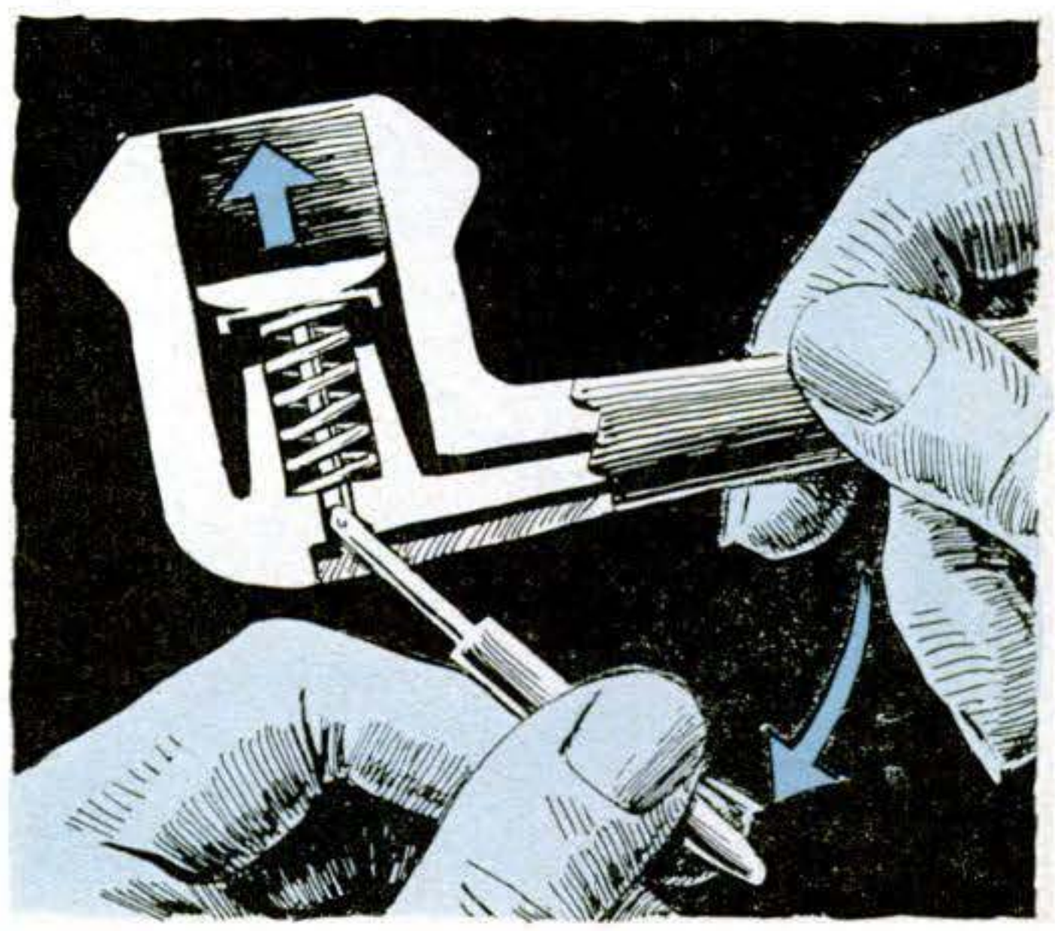
New Ideas

FROM THE INVENTORS



1 Sectional Boat Easy to Store. You could haul or store a boat more easily if it came apart like this one. Disassembled, these sections would nest one within another. Flanges on the ends of the units would interlock, and the paired partitions at each joint would support a seat. The assembled boat would have a smooth outer contour. If you wanted a smaller, faster craft, you could leave off one or two sections.

2 Shoe Scraper to Open with Door. A driver could avoid tracking sand, mud or snow into a car that had a convenient foot scraper concealed behind the door apron. This one would slide under the car floor and pull out each time the door was opened. Adjustable brackets would adapt the scraper to fit different makes of cars.

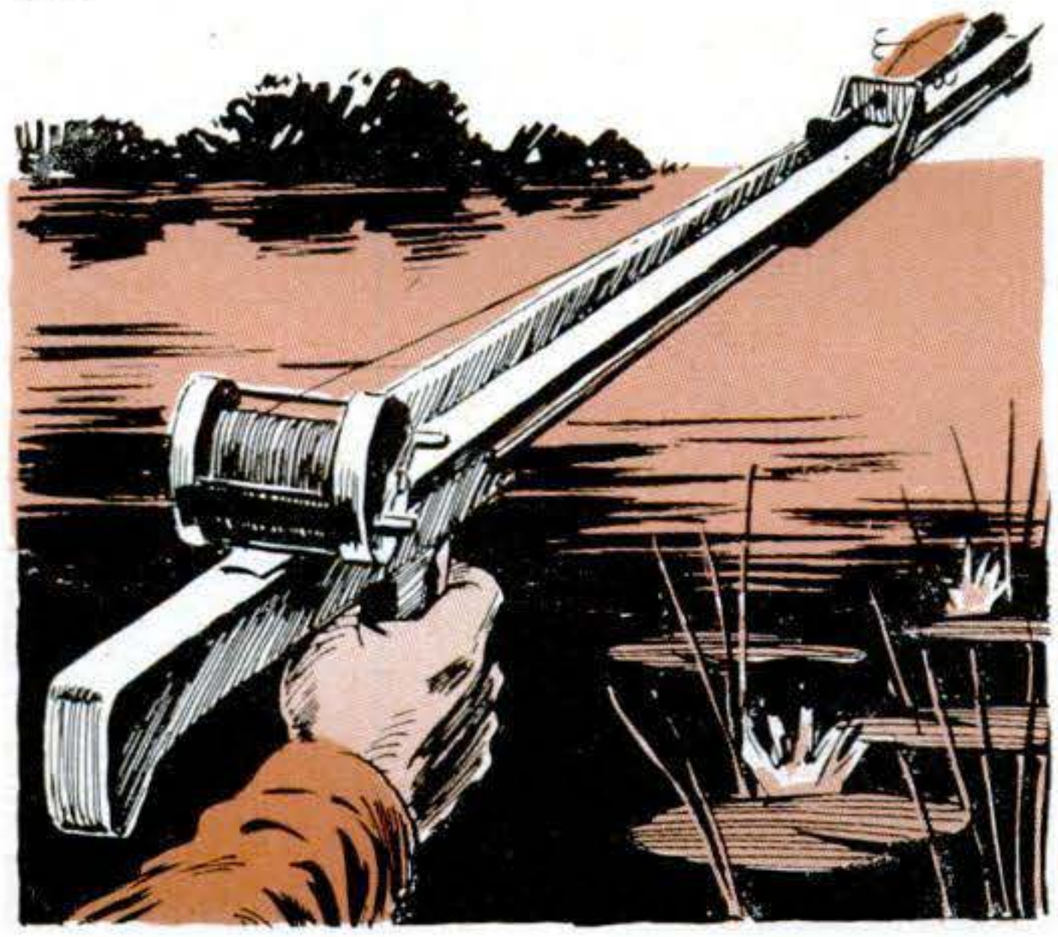


3 Pipe to Clean Itself. Some of the messiness of pipe cleaning might be eliminated by a plunger that would eject ash and soggy tobacco heel. The rim of this one would be shielded to block passage of tobacco juice and shreds into the spring and pivot mechanism. The lever that retracts the plunger would fold into a slot.

Please turn the page for more new ideas.

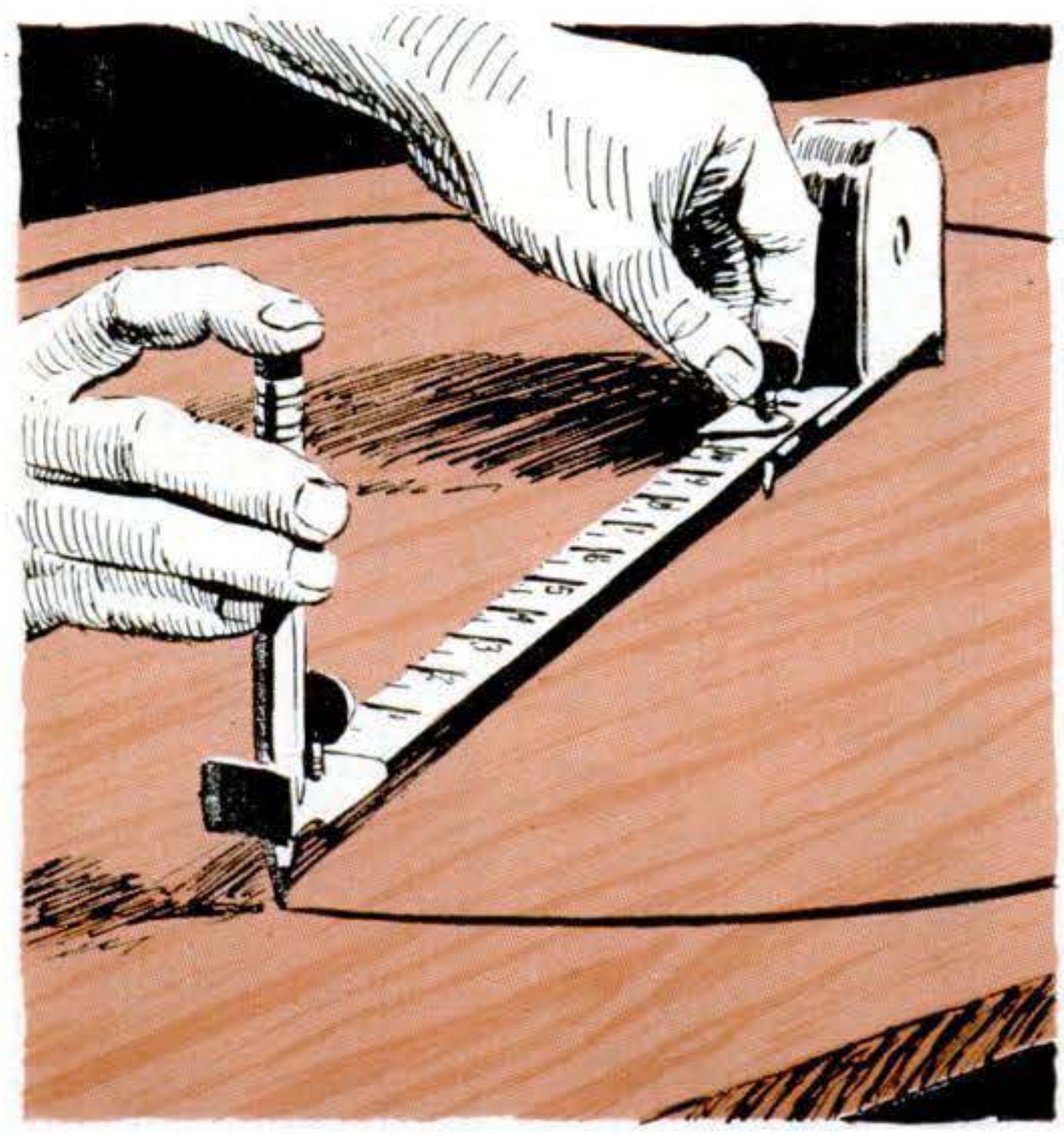
Copyrighted material

MORE New Ideas from the Inventors

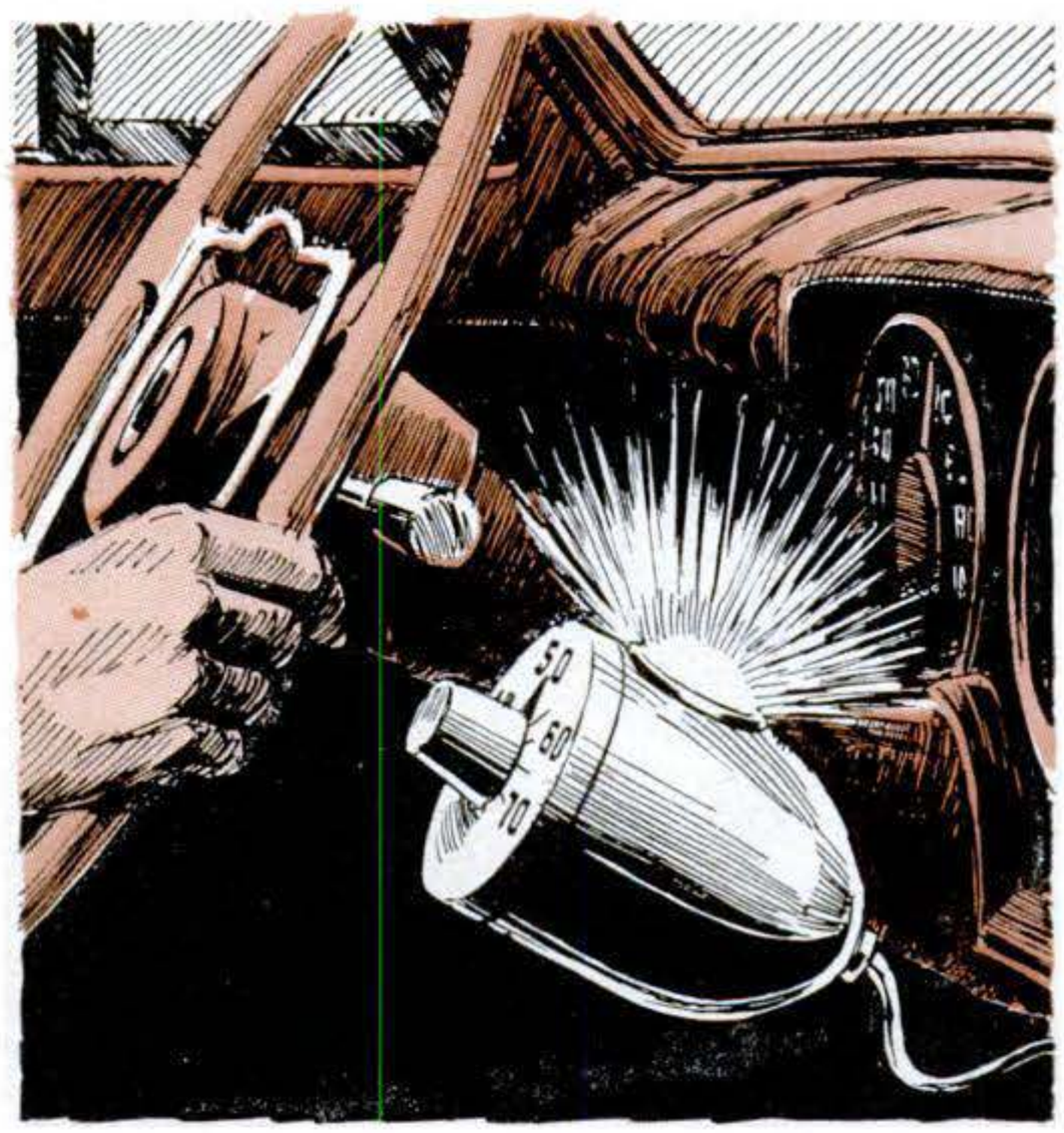


4 Gun to Cast Fishing Line. Triggering a rubber spring would shoot the hook on this line out to midstream. The gunlike rod would help a novice fisherman get a good cast; experienced anglers could use it where crowding or foliage might make it difficult to throw a hook. Springs of varying power would control casting distance.

5 Angled Brush to Paint Sash. Clipped over an ordinary paintbrush, this metal hood would shorten and reshape the exposed bristles. Each stroke of the bunched bristles would lay more paint on narrow surfaces such as trim and window sash, and the outer bristles would be less likely to spread, splatter or overrun a line.

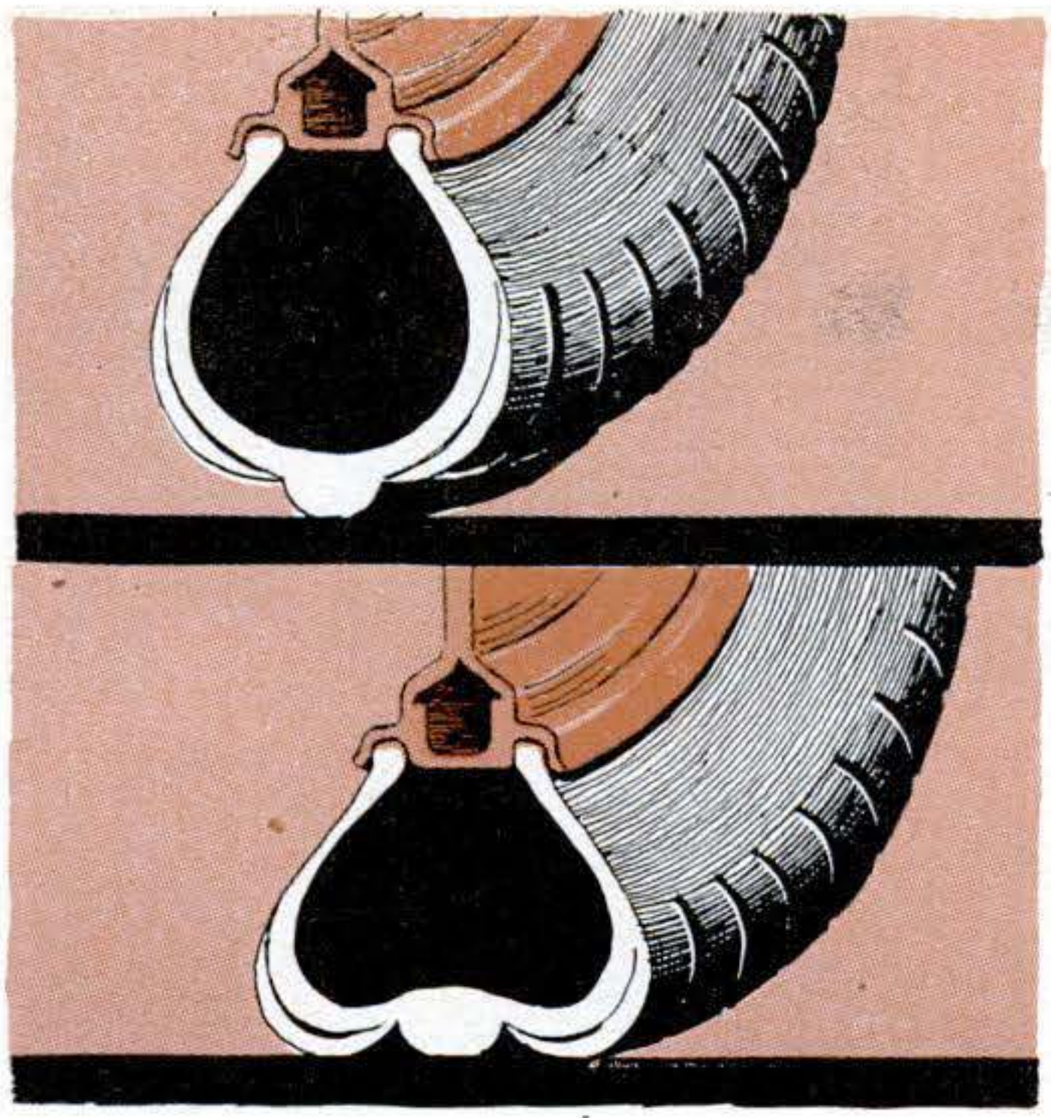


6 Rule Attachment to Draw Circles. By converting any steel tape or folding ruler into a compass, this attachment would simplify accurate drawing of large-radius circles or curves. A pivot or center clip that would be movable along the ruler's edge could be indexed at any desired radius. A clamp at tip would hold pencil or scriber.

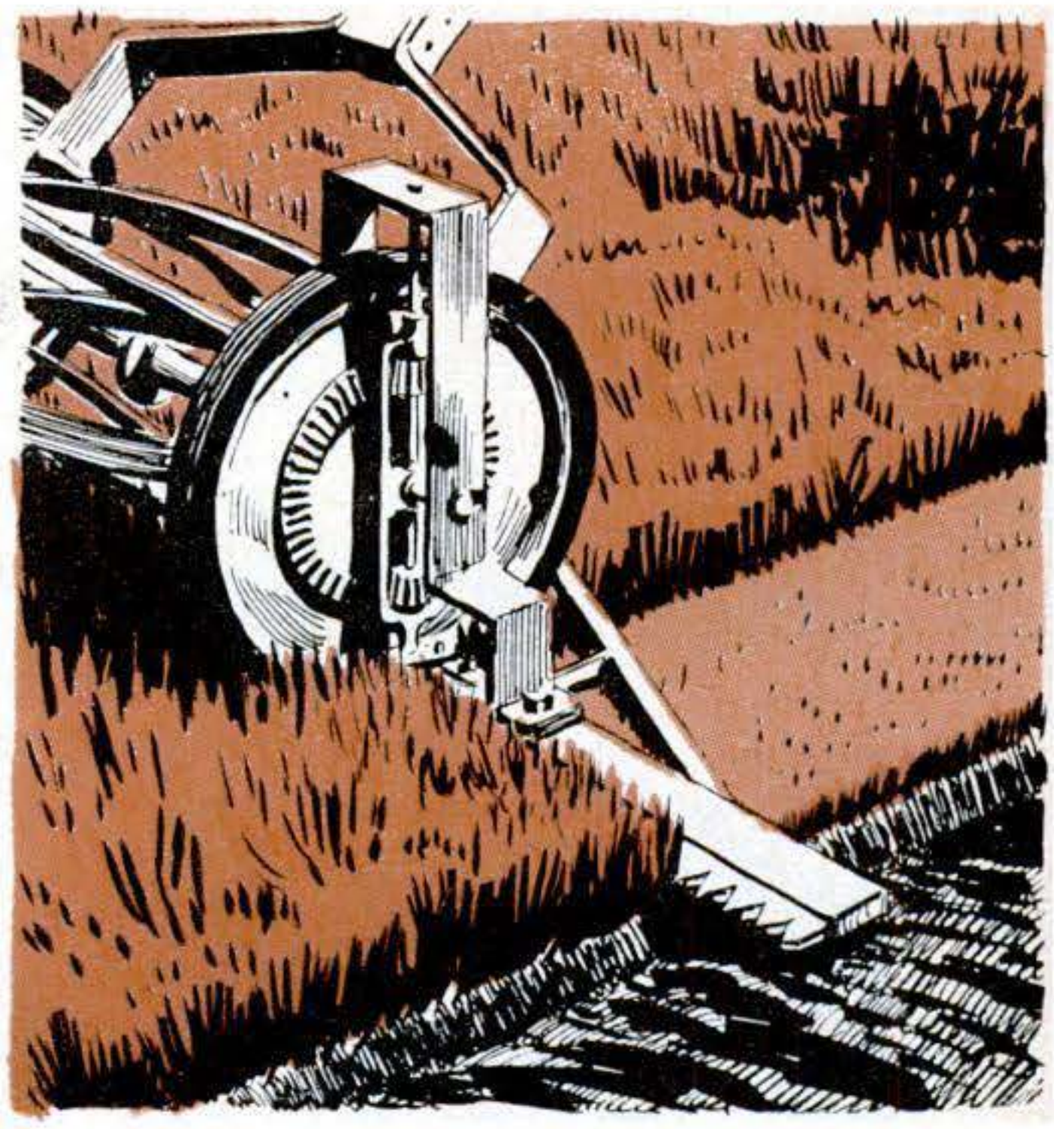


7 Signal to Warn of Speeding. If you find that it takes too much concentration to keep within changing speed limits, you'd probably welcome this gadget. You would simply set the dial for the limit you wanted to observe. Any time you went over it, a light or buzzer would remind you to let up on the pedal.

Copyrighted material



8 Tire to Adjust to Road. Fully inflated, this tire would ride mainly on a heavy-duty center ridge. When slick surfaces demanded more traction, the driver would let air out to put extra tread in contact with the road. The inventor proposes to make the center bead replaceable so normally worn tires could be easily renewed.



9 Mower Shears to Clip Edges. A pair of shearing blades jutting from the side of a standard lawn mower could reach under hedges and trim up close to curbs and flower beds. A gear and yoke would be bolted to the wheel, and the outboard portion hooked on as needed. Wheel motion would drive the reciprocating saw-toothed blades.

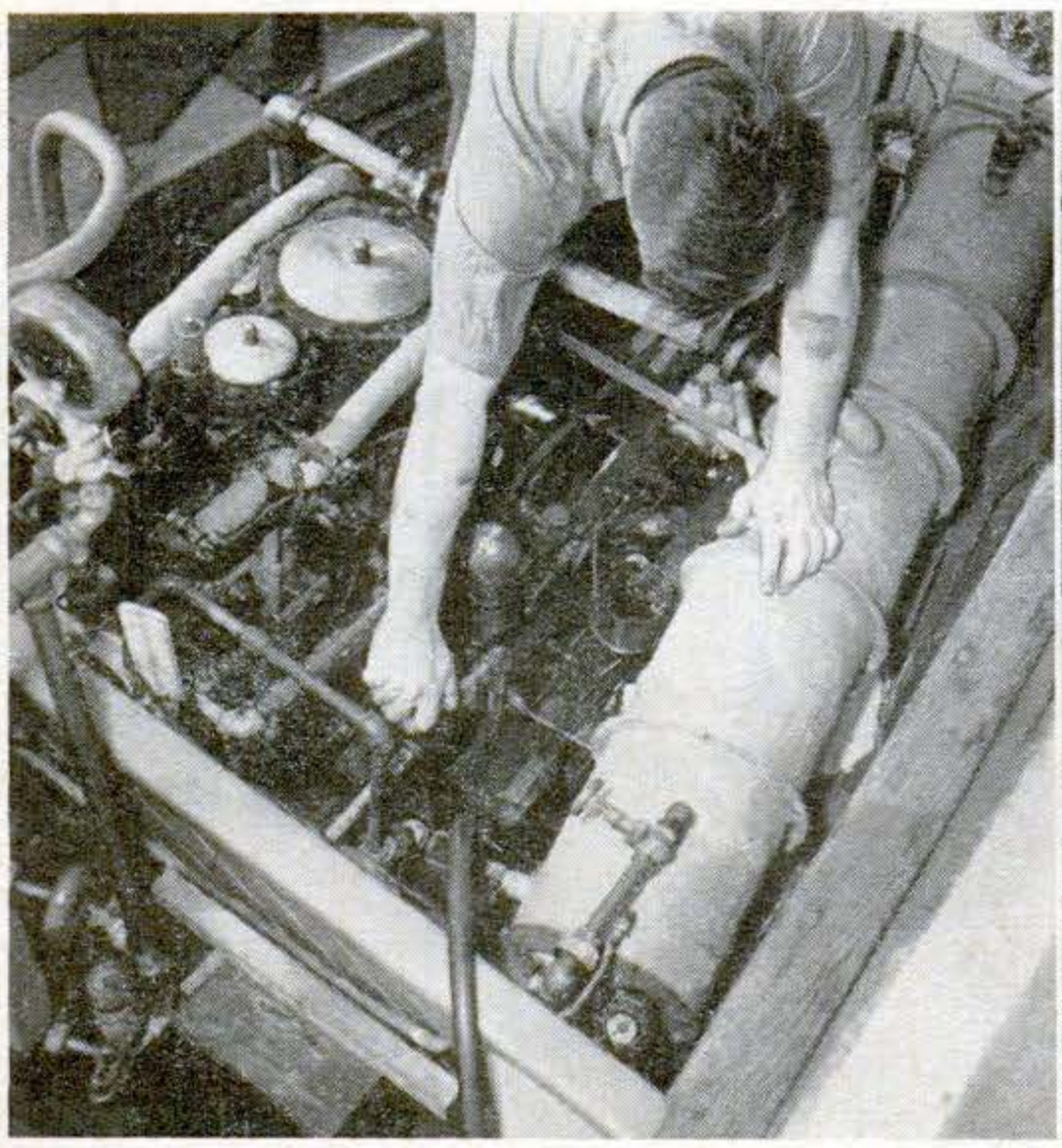
10 Bomb to Blow Out Fires. This fire-fighting bomb would have a warlike explosive head, but its fragile body would hold a quantity of fire-extinguishing chemical. Detonation of the head would create a partial vacuum over a wide area, and this would be quickly filled by a blanketing mist of the chemical. Wider dispersal of the fire-fighting agent, says the inventor, would make this bomb more effective than conventional extinguishers for smothering forest fires, oil fires and similar large-scale blazes.

U. S. patents on these inventions have been granted to: 1. B. Sommer, Evanston, Ill.; 2. C. Schetzer, Goodland, Kan.; 3. J. Di Federico and N. Di Lorenzo, Southbridge, Mass.; 4. J. Fisher, Medford, Wis.; 5. R. Perkins, Niles, Ohio; 6. A. Goodford, Wilkes-Barre, Pa.; 7. G. Tod, Schenectady, N.Y.; 8. J. Langdon, Long Beach, Calif.; 9. A. Drohomer, Santa Ana, Calif.; 10. L. Talbot, Livermore, Calif.

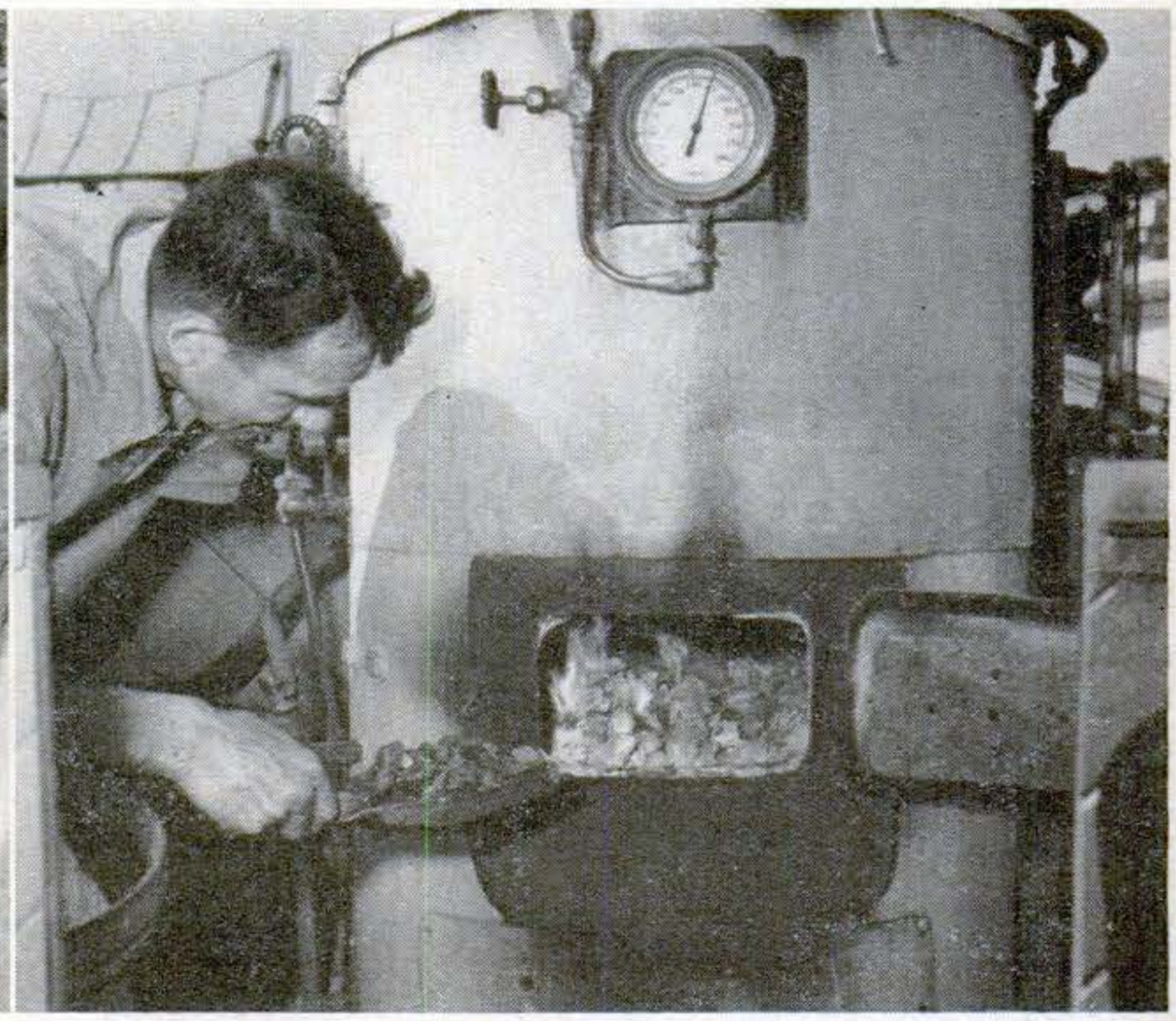
Copyrighted material

LITTLE EFFIE GETS UNDER WAY, heading past the prow of the Academy's training ship, *American Mariner*. The 26-foot steam whaleboat displaces three tons. It averages six knots.

When classes are over, Merchant Marine Academy instructors play at what they teach in a homemade miniature steamship.



A FOUR-FOOT CONDENSER (under the engineer's left hand), nine inches in diameter, takes discharged steam from the boiler, cools it with sea water and returns it as feed water.



POURING ON THE COAL with a scoop, a crewman fires up the boiler. It has a draft gauge and two whistles—one chimes and the other peeps like a French locomotive.

Copyrighted material

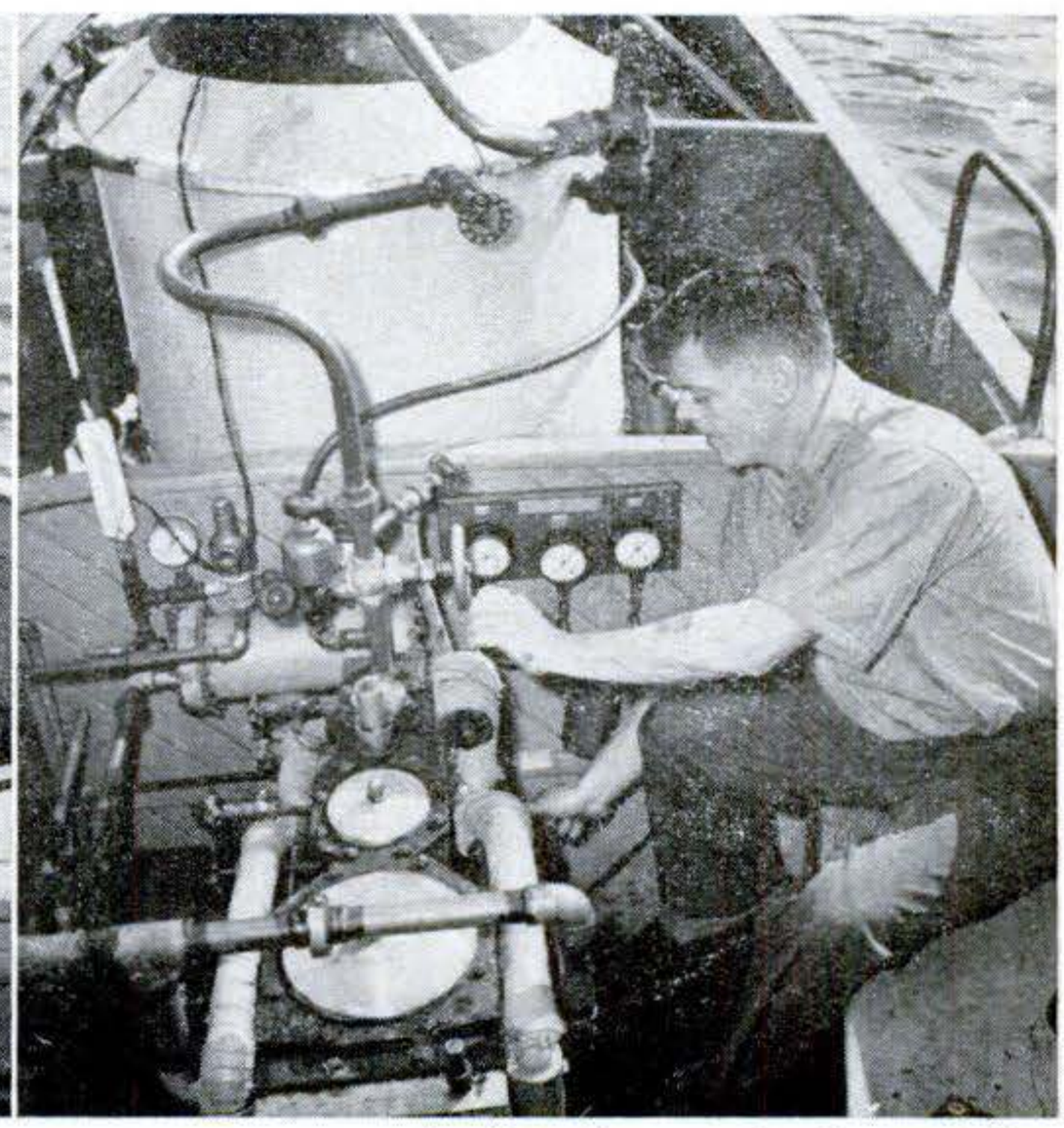
Pretends It's a Ship

THE CAPTAIN calls the boiler room by sound-powered, merchant-ship phone. Cmdr. L. S. McCready, USMS, who owns *Little Effie*, is at the tiller —oops, we mean "on the bridge."

FROM May to October, a taut but hybrid craft called *Little Effie* can be seen and heard nearly every day puffing about the Sound waters off northwestern Long Island. She is perhaps the only steam-powered whaleboat afloat. Her exhaustively elaborate steam plant is like a Liberty ship's in miniature.

Her master is Commander Lauren McCready, head of the department of engineering at the U.S. Merchant Marine Academy, Kings Point, N. Y. (PSM, May, p. 142). He found her on her uppers, brought her home to the Academy, lovingly restored her oak-framed, copper-fastened hull, equipped her with a home-made boiler and engine, and named her for his mother. Commander McCready and faculty friends are shown here on a typical voyage, earnestly at play. END

PUMPING OUT THE BILGE is one of the jobs of a one-cylinder, double-acting auxiliary steam engine. The engine also injects feed water into the boiler, runs its forced-draft blower.



DRIVING ENGINE is this three-cylinder, triple-expansion, double-acting job, which develops 15 to 20 horsepower at 400 r.p.m. There is a pressure gauge on each cylinder receiver.

Copyrighted material

Motor Chair Climbs Up and Down Curbs

THIS wheel chair steps up and down curbs in low, scoots down the road at 10 to 15 m.p.h. in high, and can travel in sand and snow. It runs on a two-cylinder engine complete with self-starter.

A paraplegic, M. Arnold Lerman, 310 East 34th St., NYC, worked out the Curb Stepper so that he could get about the city without any help along the way. He hopes to market the motorized chair for about $400.

▶▶▶The busy bee is busier than ever now. A new breed of honeybee developed at the University of California is said to gather up to 15 times as much pollen in his lifetime as his slower kin. Farmers who keep bees to improve the pollination of their crops will need fewer hives.

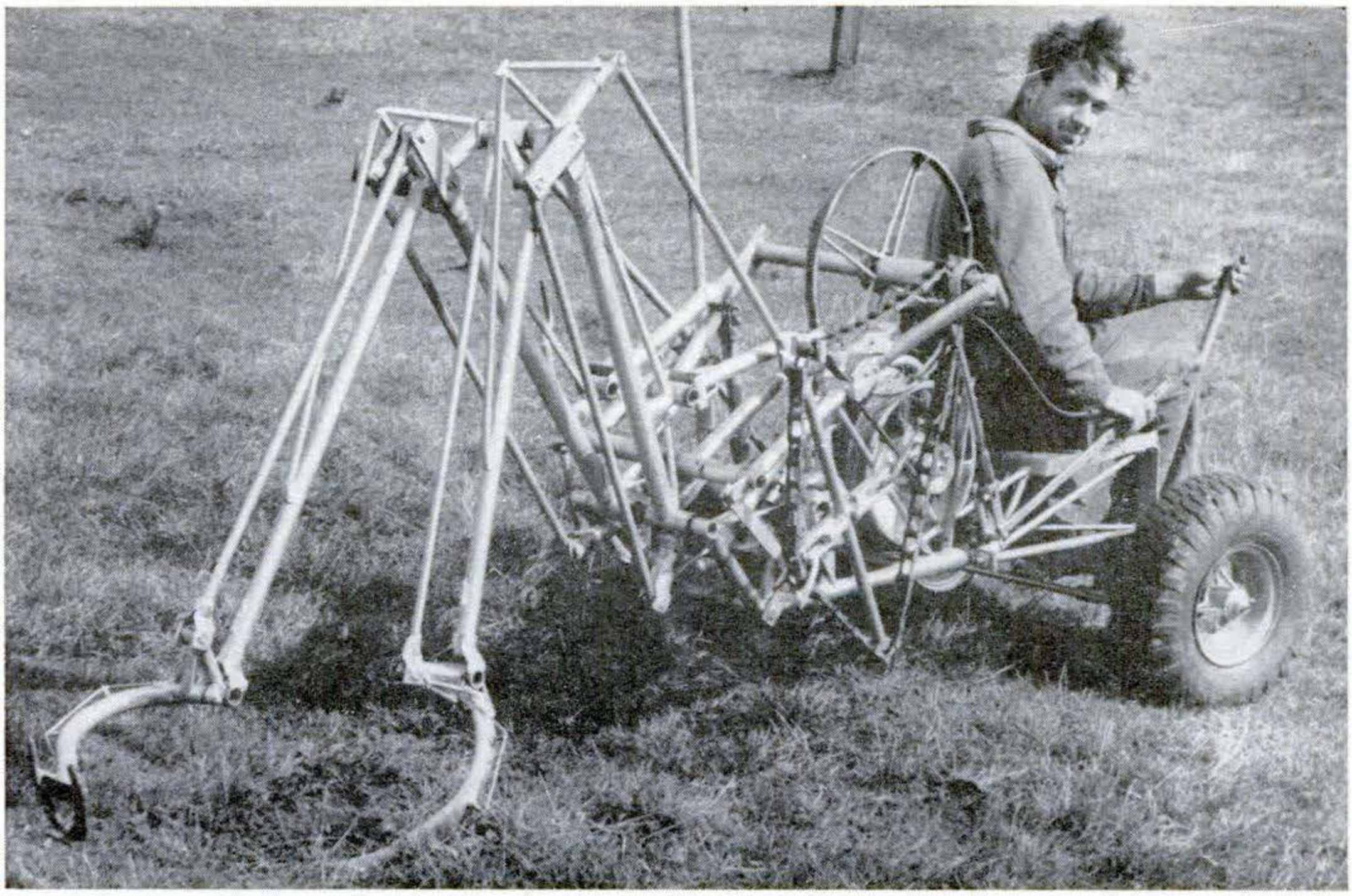
Picture Book Takes a Tubbing

THIS picture book, of water-resistant plastic, goes right into the tub with the junior artists when they finish their painting session. Both kids and coloring book, the latter made in West Germany, wash off for more art work on another day.

Paint Pens Seal Color Inside

WITH these fountain brushes, your youngster won't make a mess mixing and splashing water colors. Fill each handle with water, and a food-dye tablet inside dissolves to provide hours of daubing. Kenner Products, 912 Sycamore St., Cincinnati, makes the kit.

Copyrighted material

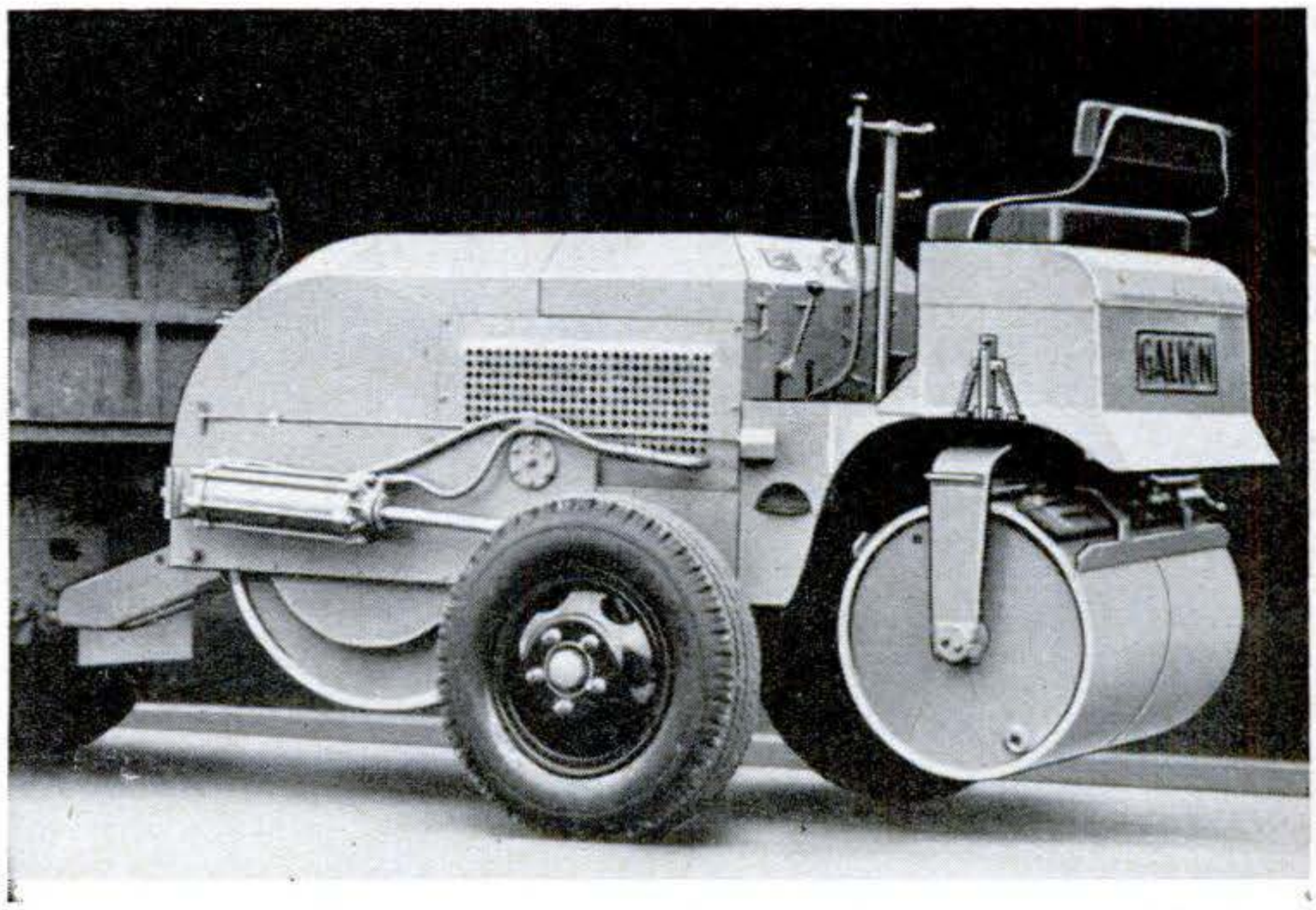


This Walking Tractor Wears Horseshoes to Conquer the Mud

"WALKING" on bow legs, this odd tractor ambles over the fields shod with horseshoes. Douglas Lattimore, the English farmer who built it, says it can navigate in deep mud, planting each leg firmly before taking the next step. A handle controls the length of its stride and a lever steers the two front wheels over which the driver perches.

Pressing Iron Also Brews Tea

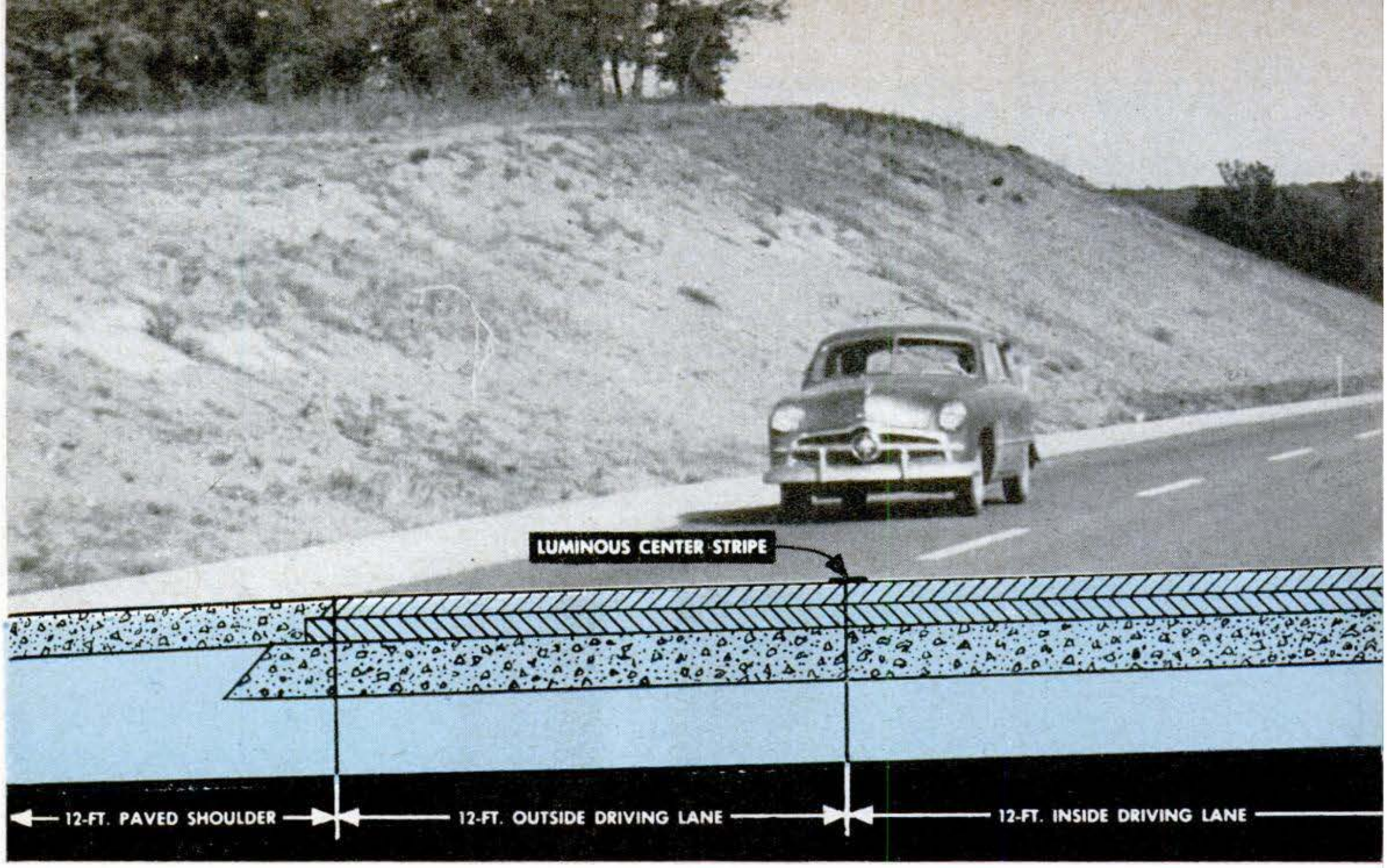
TURN this new German iron upside down, set the heat switch for a high temperature and you have a convenient hot plate for cooking. There is a built-in rest for holding the iron steady. It is manufactured by AEG, Berlin-Grunewald.



Retractable Wheels Speed Roller Over Highway

TOWING the roller above from job to job is faster because it rides on rubber-tired wheels. An engine-driven hydraulic jack, built into the truck hitch, raises the forward roll and lowers the wheels. The steering roll goes up as the wheels come down. Galion Iron Works, Galion, Ohio, makes it.

Copyrighted material



Center hump helps keep cars from crossing to opposite lane of Oklahoma's new turnpike.

The Sooners' Speedway Is a Safeway, Too

The Turner Turnpike's accident record shows that it is not speed alone that kills motorists.

By Gilbert Hill

IF YOU can't drive 88 miles in 88 minutes—and have time to stop for a cup of coffee on the way—you're a sissy.

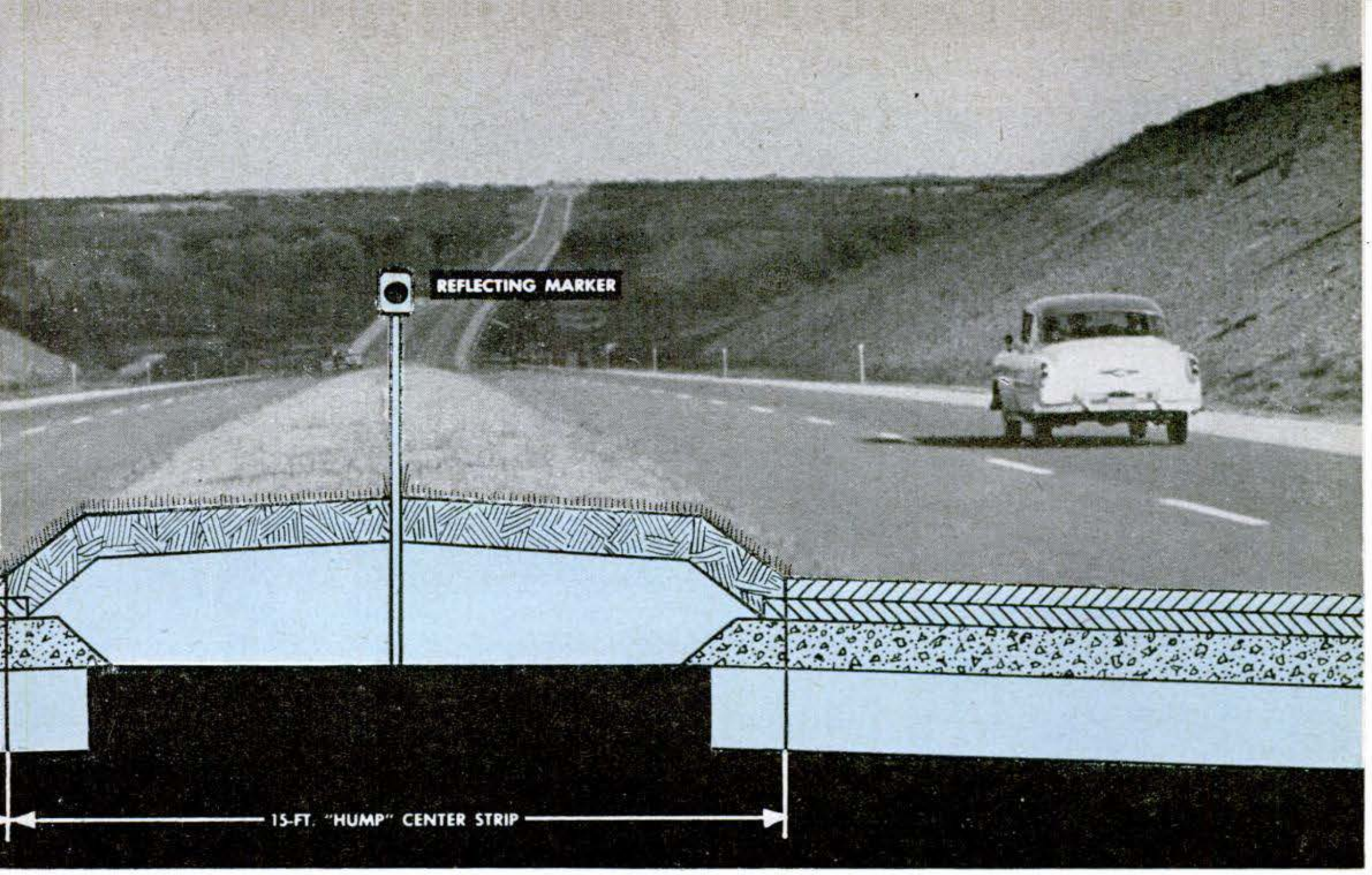
That's what they say in Oklahoma about the Turner Turnpike between Oklahoma City and Tulsa. Yet this new road is being watched by safety experts and highway engineers throughout the country. They hope that the 88-mile, four-lane strip will teach them lessons they can pass on to the nation's 47 other states.

The turnpike is only 14 miles shorter than U.S. 66, which connects the same cities. There wouldn't be much point to it if it were not engineered for speed. But it is.

The Turner Turnpike has few rivals in this department, with a *minimum* of 40 miles an hour and a top of 70. On its smooth asphalt a driver can save an hour's time over slow, narrow U.S. 66.

As to safety, the road has an enviable

Copyrighted material



A full 12-foot graveled lane runs along the road flanks, for emergency repairs or napping.

record since it opened in May, 1953, of only four persons killed. One woman lost control of her car when a house trailer she was pulling began to weave. The other three fatalities apparently resulted from drivers going to sleep at the wheel.

Speed itself does not appear to have been a major factor in accidents on the Oklahoma turnpike. It's the combination of high speed, whistling wind, singing tires and easy driving—with no worry about anyone leaping into you head-on—that seems to be a Lullaby of Death. The driver apparently goes to sleep. He is killed.

In fact, some highway patrolmen are wondering if just enough extra speed to make the driver feel a little uneasy might not in itself be a safety factor. At least it would tend to keep him awake at the wheel.

Fortunately, most drivers *do* keep their eyes open while driving, and for them the Turner Turnpike has a novel safety gimmick—the "hump"—which is likely to affect the construction of multiple-lane highways for years to come. This hump is a 15-foot-wide, foot-high earthen center, or median strip, separating opposing lanes of traffic. It is easy and inexpensive to construct.

The idea isn't new. The Pennsylvania Turnpike started with a 12-foot-wide de-

WELCOME AND WARNING CARDS are handed out to drivers as they enter these toll gates. This is Oklahoma City end. The highway was named for former governor Roy J. Turner.

Copyrighted material

GLASS-ENCLOSED WALKWAY at the halfway point lets motorists who stop on the near side of the dual road cross safely to restaurant at right. There are gas stations on both sides.

pression, or ditch, between traffic lanes. But through the years this has filled up, with the result that cars going out of control hurl themselves head-on into the approaching lane.

The Merritt Parkway in Connecticut has planted a barrier of trees that is very beautiful. But time has shown that cars piling into trees kill, too.

Out of that and other experiences came the hump in Oklahoma. The bank rises steeply from the pavement, nine inches in the first 18 inches from the edge. A car that goes out of control from a blowout or other cause usually is on the inside, or passing, lane, nearest the approaching lane of traffic. Without an effective barrier it would careen into the opposite-traffic lane.

The hump serves to throw the car back into its own lane so that the accident happens with the wild-car driver going in the same direction as cars in front, behind and beside him.

In a really bad accident, the car could be thrown at right angles to the hump. Then it could go over into the opposite lane. A study of accidents, however, shows that either of two things happen: 1) a slow-moving car hangs up on a high center, straddling the hump, practically undamaged; 2) a high-speed vehicle uses the hump as a ski jump, hurdling over the opposite pavement onto the shoulder, clearing the approaching lanes almost immediately.

Crossing the Hump

Another function of the hump is to help prevent accidents by serving as a mental obstacle. Covered with grass, it appears to be much higher than it really is. But it is still high enough so that a driver cannot cross it readily, even on purpose.

Visibility is another important factor. Engineers claim that there isn't a point along the highway where a driver can't see an object four inches high at least 700 feet ahead. An average driver with average brakes can stop a car going at 70 within 400 feet.

The Oklahoma turnpike greets its toll-payers with a "friendly reminder" card that reads, in part:

"Almost all accidents on the Turnpike have been caused by the following:

1. Blowouts at high speeds.
2. Drivers going to sleep.
3. Brake failure at toll booths.
4. Weaving cars and trailers.
5. Following too close.

"A 45-mile-per-hour limit has been placed on cars pulling house- or 4-wheel trailers. We cannot do anything about the other causes. You can." END

STUBBORNLY Joe shoved the knotty piece of wood into the circular saw. It groaned, dragged, and stopped dead. Swearing, Joe yanked the work free and went to the fuse box. But no fuse was blown. Afraid that the motor had burned out, he bent over the saw to feel the housing. It wasn't hot, but the moment he touched it the saw started up again, giving him a scare he never forgot.

...How Come?

ANSWER: *The motor was protected by a thermal overload relay. This opened when Joe stalled the blade, but in the time it took him to check the fuse box it cooled off again. As he hadn't turned off the switch, the motor promptly restarted.*

Copyrighted material

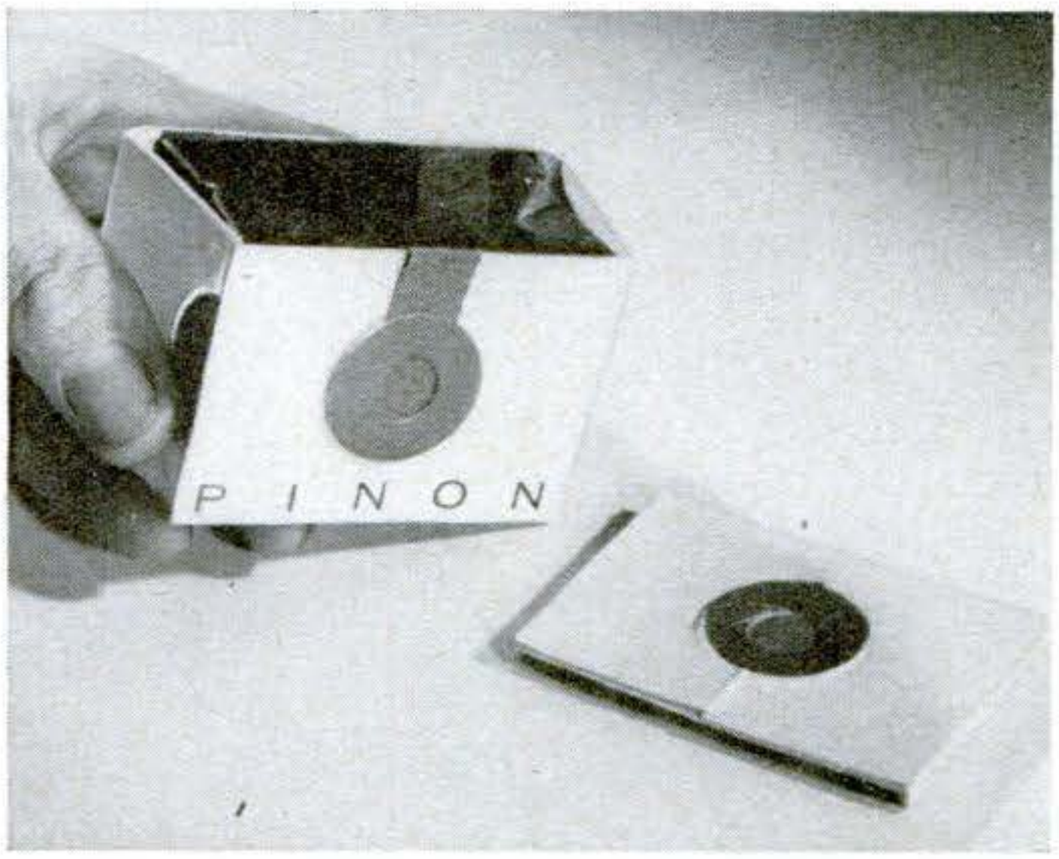
Foot Pontoons Let You Walk on Water

THIS cautious gal is making an indoor dry run to try out a pair of foot floats exhibited at an inventors' fair in Belgium. Each float is composed of four inflatable rubber compartments which, says the French inventor, give the footwear "floating stability."

But he doesn't mention what happens if you lose your balance while paddling, and take a nose dive into the drink.

Car Plates Identify Ham Radio Operators

HAM radio operators in 25 states can carry their call numbers on their car license plates. The system makes it easy for civil-defense officers and police to identify operators for quick communication in emergencies.



Camera Shoots Only Once

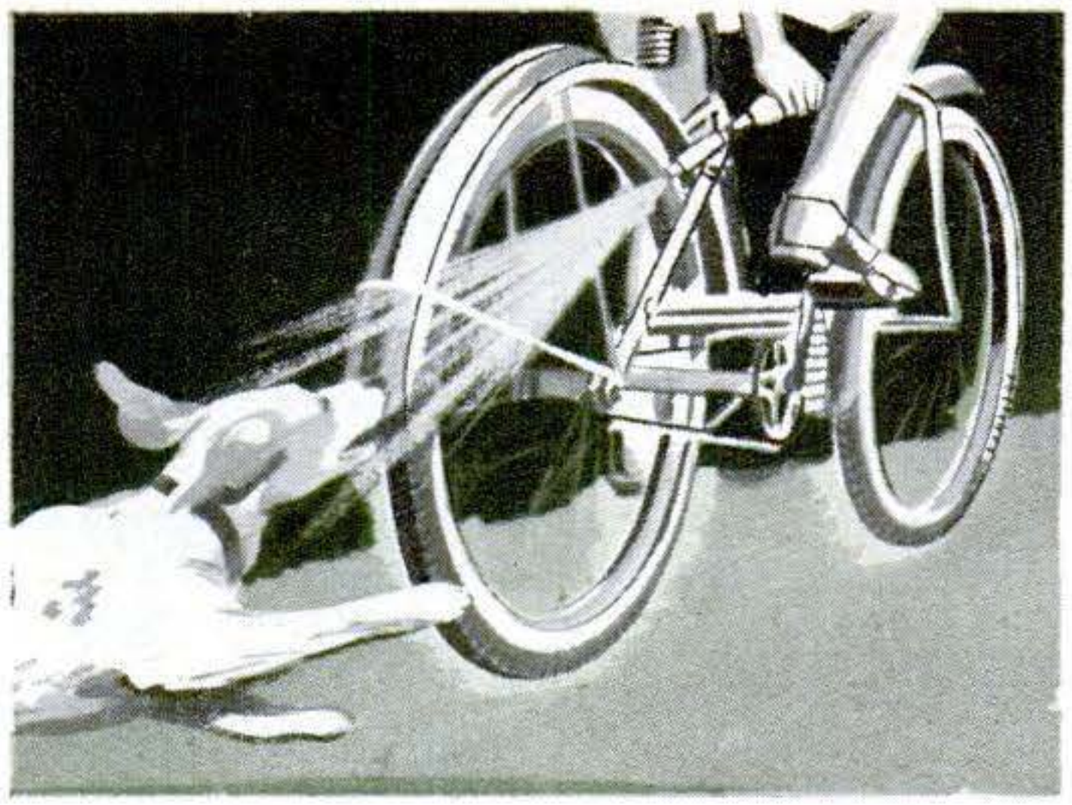
THE camera above takes one picture; then you throw it away. It unfolds into a box with a paper tab for a shutter and a hole for a lens. The Taylor-Merchant Corp., NYC, sells it as a give-away premium.

Plastic Armor Shields Police

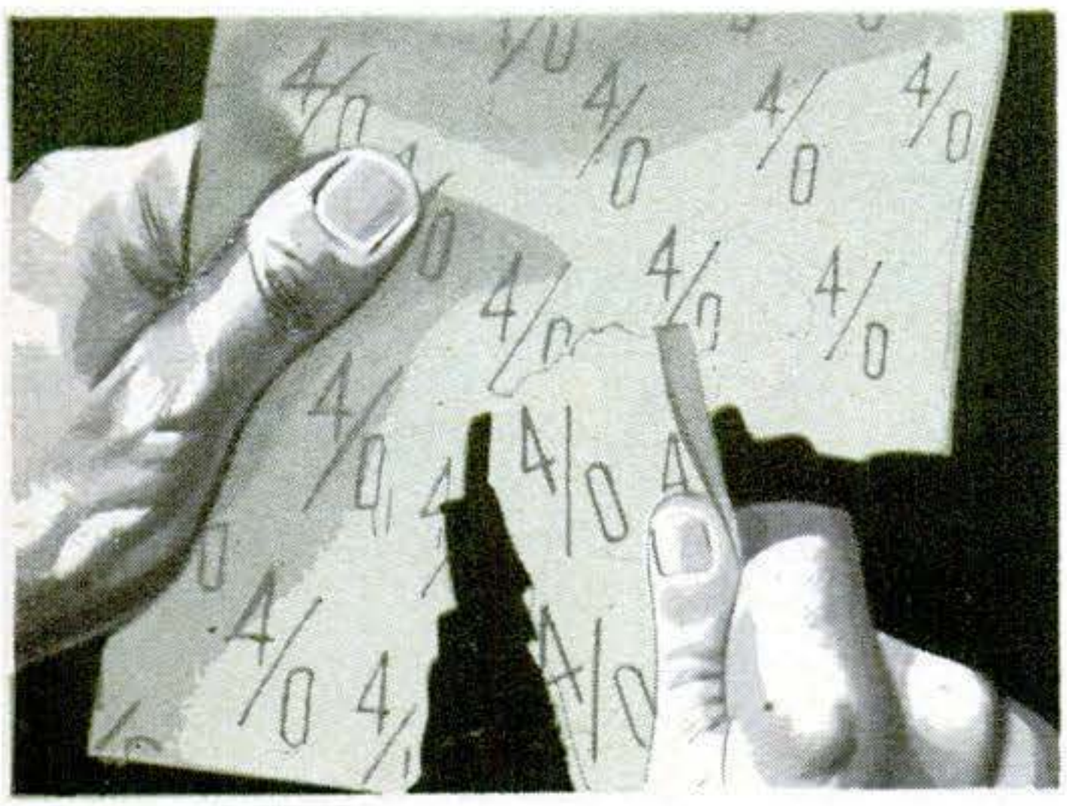
THIS glass-fiber-and-plastic shield blocks .45-caliber bullets fired point-blank from a distance of 20 feet. A policeman ducked behind it can watch his opponent's moves through a bulletproof window.

Copyrighted material

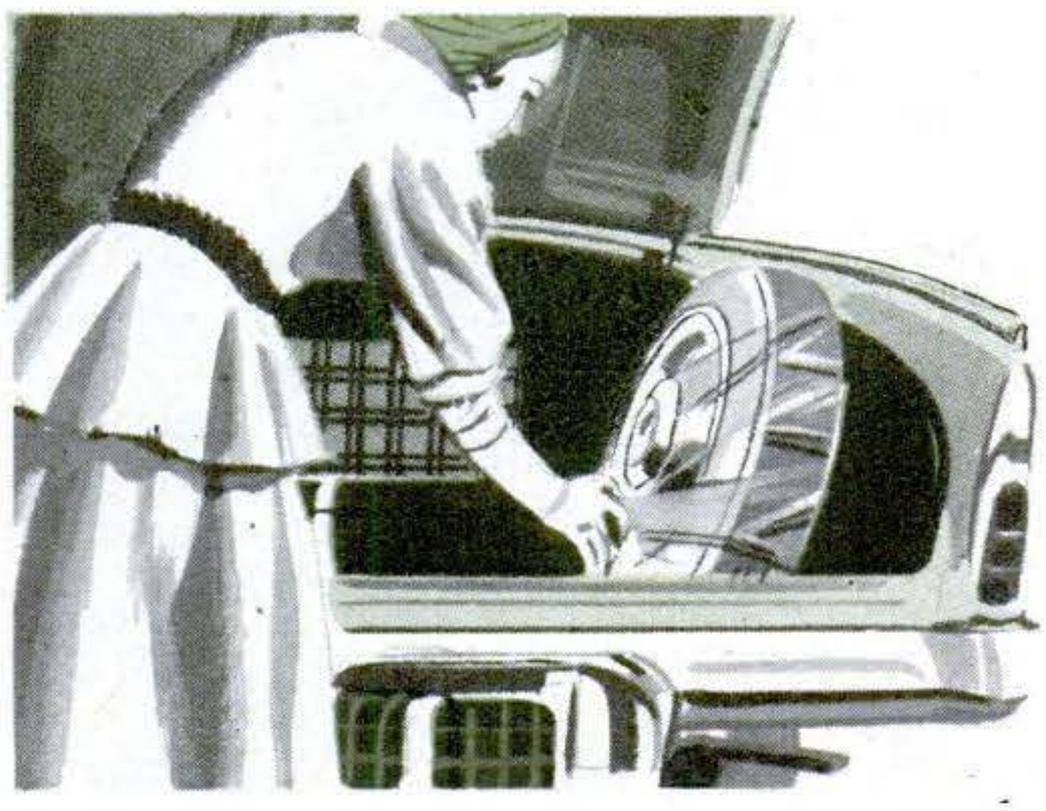
I'd Like to see them make...



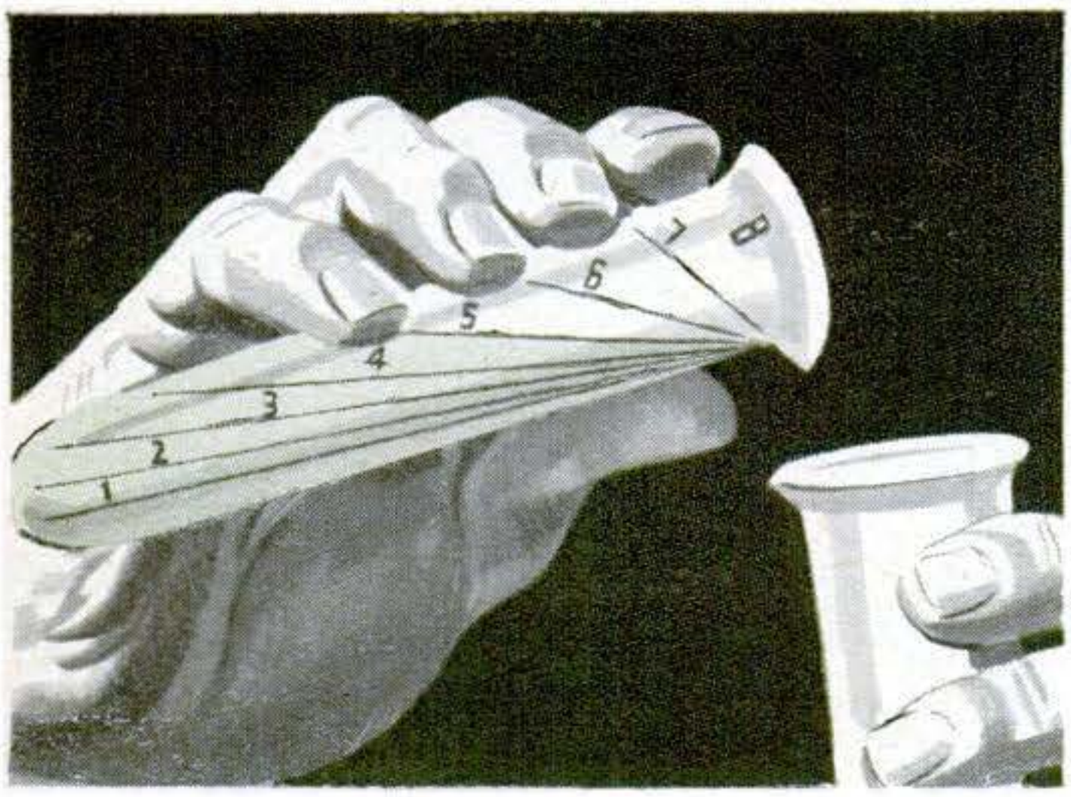
A WATER SPRAYER to fit a bike so the rider could squirt dogs to discourage them from chasing after him or biting at his legs.—*Mrs. Ludvig Peterson, Thief River Falls, Minn.*



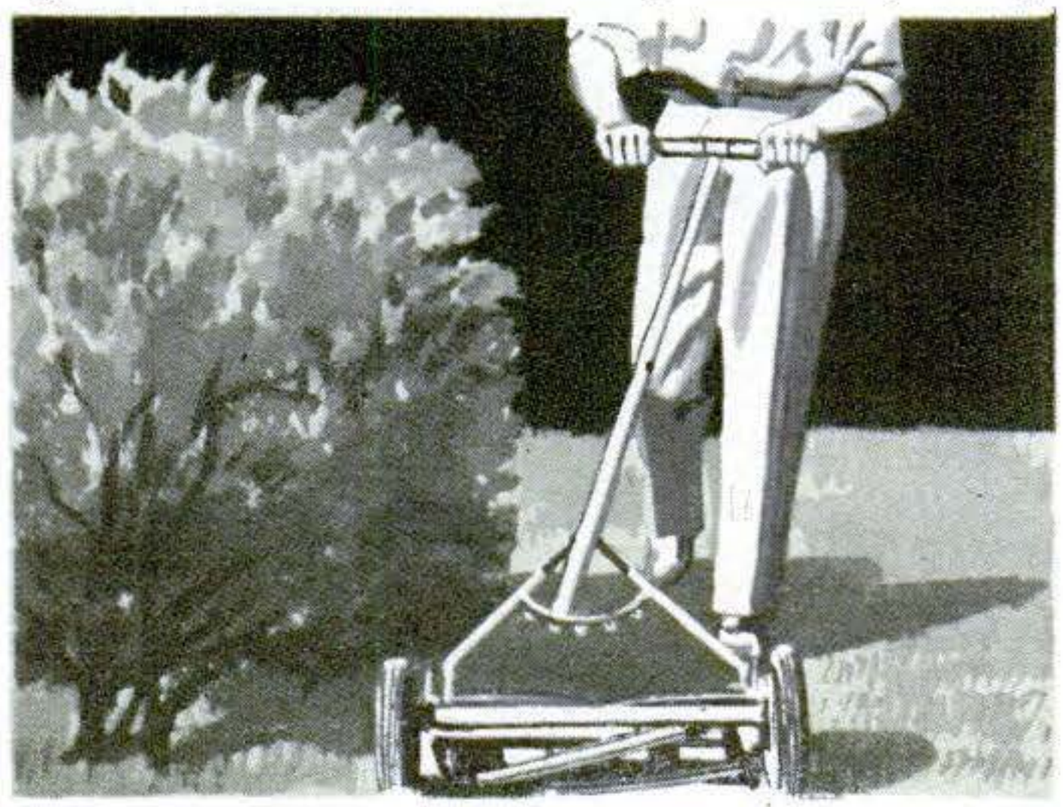
ABRASIVE PAPERS with grit size stamped all over the back. As now marked, once you tear off the number, you can no longer identify the sheet.—*J. J. Richards, Brookline, Mass.*



A PLASTIC TIRE COVER for the spare so luggage and other items packed in the car trunk would not get soiled with road grit and grime.—*Melvin R. Turner, Modesto, Calif.*



A GRADUATE with markings so placed that they give a constant reading of the amount of liquid in the container while it is tilted for pouring.—*Eugene Reiser, NYC.*



A LAWN MOWER with a handle that moves horizontally toward one wheel, making it easier to mow close to, or under, hedges and bushes.—*Larry Edwards, Hereford, Tex.*

Everyone has his own pet idea of a gadget that he would like to see in general use. The five ideas illustrated above were suggested by *Popular Science Monthly* readers. What is *yours?* We will pay $5 for each one published. Please use government postcards only. Write name and address clearly. Contributions cannot be acknowledged or returned.

Copyrighted material

A SAVAGE TWIST OF TORQUE, balked in its effort to turn the blocked rear wheels, causes this tractor to do a back flip. The man at the left has engaged the clutch by tugging rope.

How Not to Drive a Tractor

Dummies are used by agricultural colleges to shock farmers into awareness of the perils of handling mechanical horses.

By B. F. Sylvester

A LARGE crowd at a county fair in the corn belt circled a demonstration of how to get a tractor out of a mudhole. An announcer held a microphone up to a calm and relaxed figure behind the wheel and said, "Mr. Jughead, you have chained a post to the front of the rear wheels. Will you tell the crowd why?"

"To get traction, of course. The wheels were spinning."

"But isn't it dangerous? Wouldn't it be better to try backing out?"

"Listen here, young fellow. If I didn't take short cuts, I'd never get any of my

IF A MAN instead of a dummy had been in this tractor, his chest would have been crushed by the steering post. The framework was added to protect the tractor during demonstrations.

Copyrighted material

AN "UNSEEN" LOG seven inches square is about to toss this tractor on its side, demonstrating the danger of going too fast on rough ground or where obstacles may be hidden.

work done. Now watch her climb out."

The clutch was engaged, but the wheels did not turn. Instead, the power, blocked off at the axle, went where it could. Up reared the front end and flipped the chassis over on its back.

The crowd gasped and several women screamed. The demonstration crew rushed in to try to extricate Jughead, caught by the steering post and being soaked by gasoline and oil, which might catch fire.

The announcer pushed the mike toward the victim. The crowd heard a groaned, "Maybe I was wrong," and then nothing. It was all over for Jughead —but only for the time being.

Jughead is a realistic dummy, created by the University of Nebraska's College of Agriculture. He is enlisted in a war against the heavy annual toll of dead and injured in farm-tractor accidents.

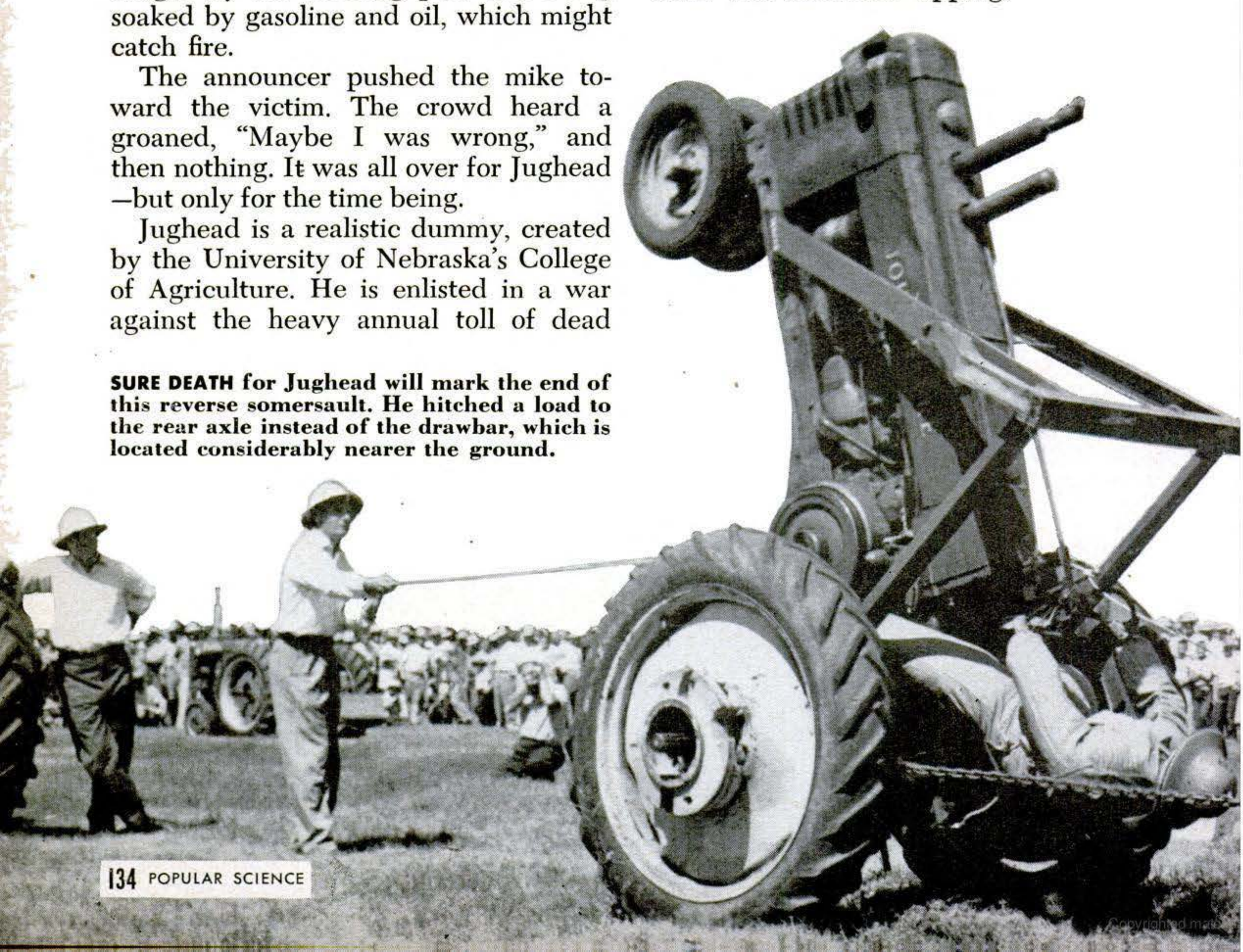
Next week, with a new head and patched-up body, Jughead would wake up some other farmers to the dangers of operating a vehicle with the short wheelbase and high center of gravity required for farm work.

Even at Five M.P.H.—Tractors Can Kill

The farm tractor operates normally in an open field, at five miles an hour or less. Yet, statistically, it is between one-third and one-half as deadly as the automobile.

In Nebraska, with a motor-vehicle population of 693,000, there were 320 highway fatalities in 1952. The tractor population of 130,000 claimed 28 lives in the same period, a ratio close to that of other corn-belt states.

The National Safety Council estimates that there were 640 tractor fatalities in the U. S. in 1950, and that the number increases by about 40 each year. More than half were caused by overturning, about equally divided between backward and sideward tipping.



SURE DEATH for Jughead will mark the end of this reverse somersault. He hitched a load to the rear axle instead of the drawbar, which is located considerably nearer the ground.

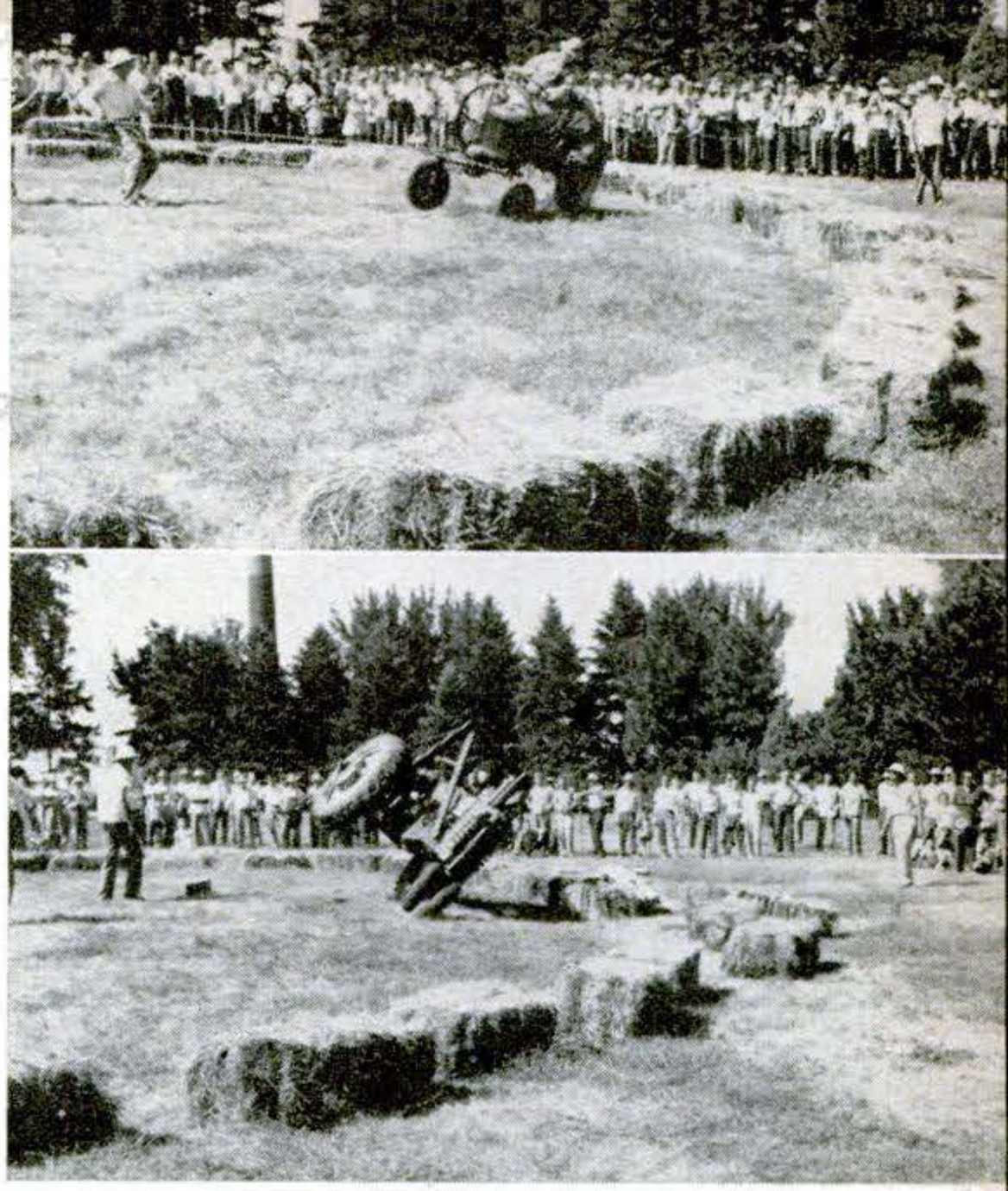
Nebraska "Ag" college authorities had been preaching tractor safety for several years, without much headway, when an accident on their own farm in 1952 woke them to a new approach.

An instructor was mowing weeds along a drainage way. The ground was soft and the tractor started to dig down. The mower appeared to be catching in the mud. It was a hot afternoon and the operator was rather hot under the collar. He unhooked the blasted mower and took off the blasted drawbar, so it wouldn't catch in the blasted mud. He climbed back onto the seat and pushed down on the gas. The tractor reared and fell over backward on top of the mower. Happily, the operator jumped clear.

Lloyd W. Hurlbut, chairman of the Department of Agricultural Engineering, and his colleagues decided to re-enact the tractor upset and take it to the farmers. They dug up a 1941 tricycle-type tractor owned by the university, and constructed the dummy. They worked out a system of remote control by which the tractor could be steered, the clutch engaged and disengaged, and the ignition shut off at safe distances.

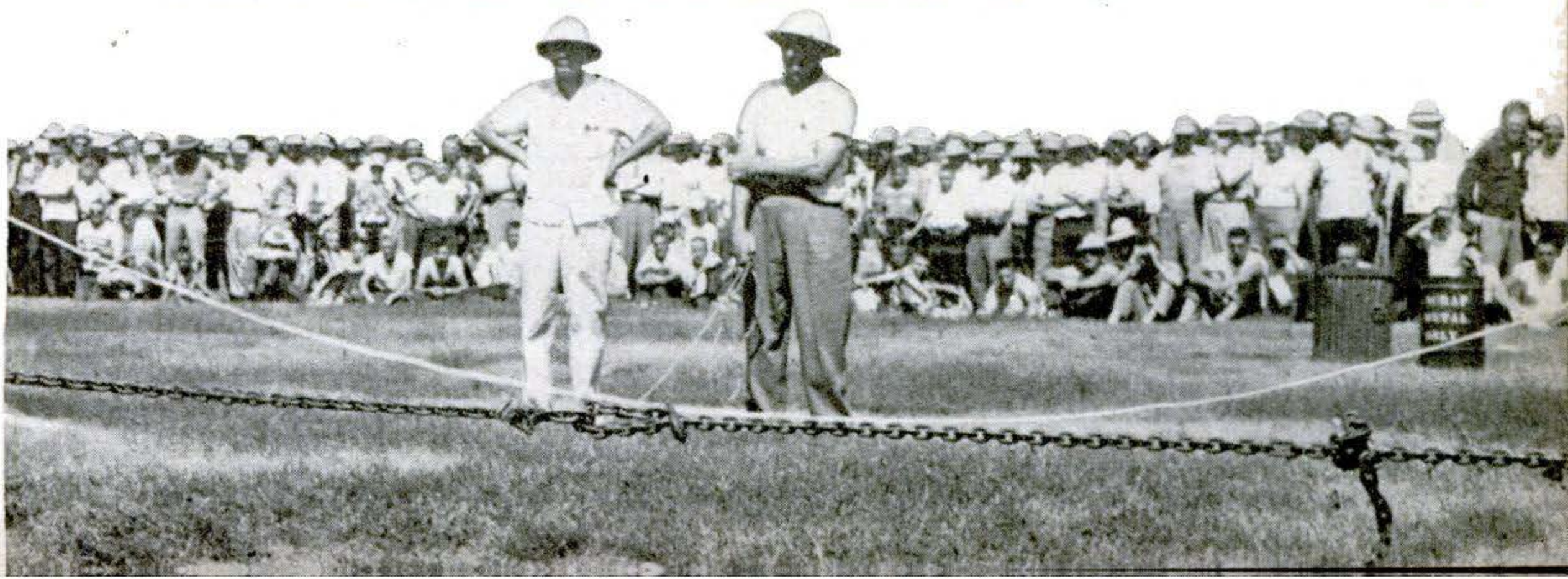
More Traction—Jughead Style

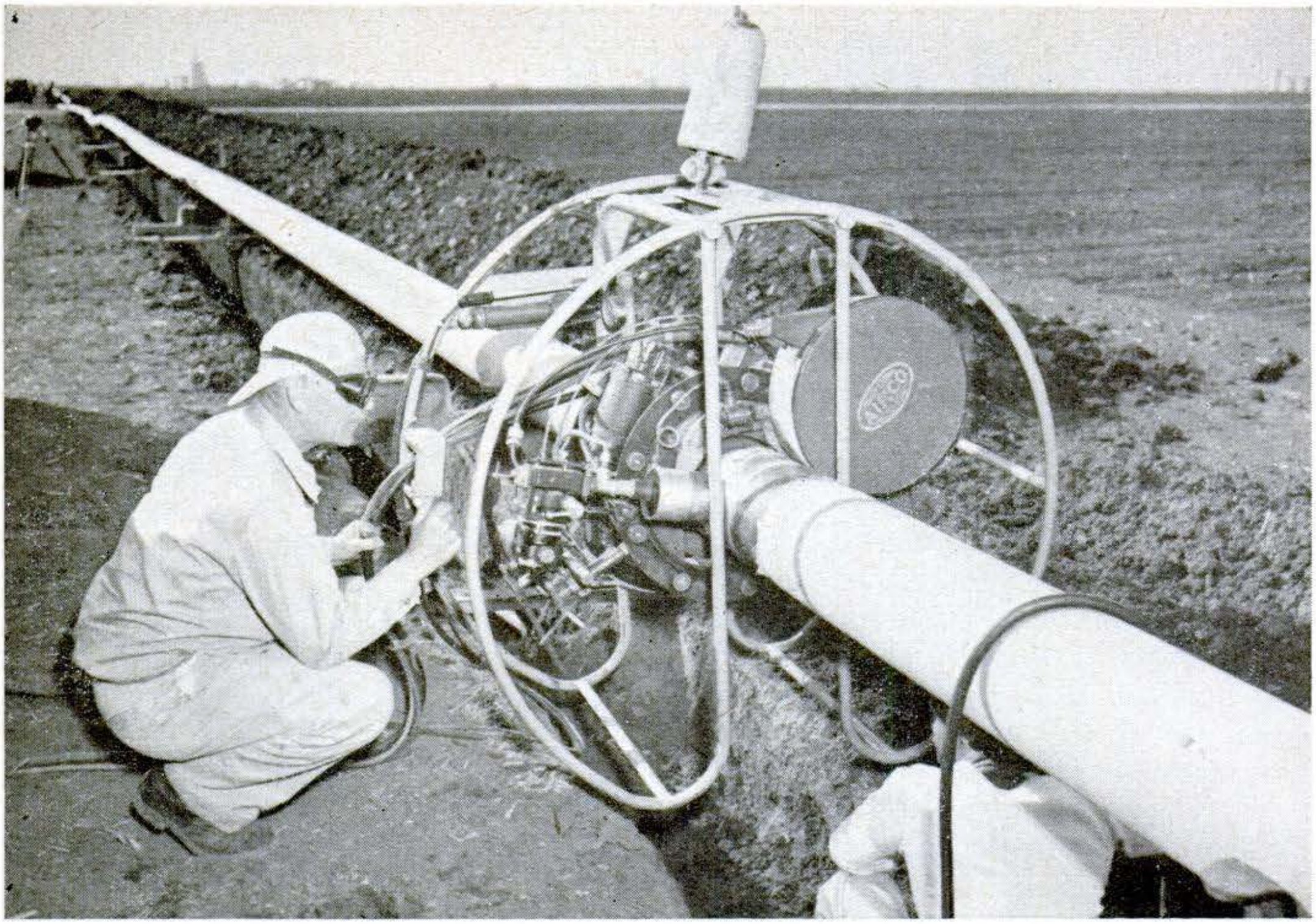
Jughead and his tractor usually are upset four times on each program. One demonstration shows the right and wrong ways to hitch loads. The proper hitch is to the drawbar, which is 16 to 18 inches from the ground. Sometimes when the load does not move, the operator hooks up to the axle with the idea of gaining traction. The axle is about 30 inches high, because a tractor must have clearance for the last stage of cultivating corn. When Jughead, by proxy, hitches to the axle and steps on the gas, the front end comes up and the tractor topples over on him.



SAD END FOR SHOW-OFFS is forecast when Jughead, with his kid brother Bozo on his lap, takes a corner too fast. The tractor tips sideways and lands on top of both dummies.

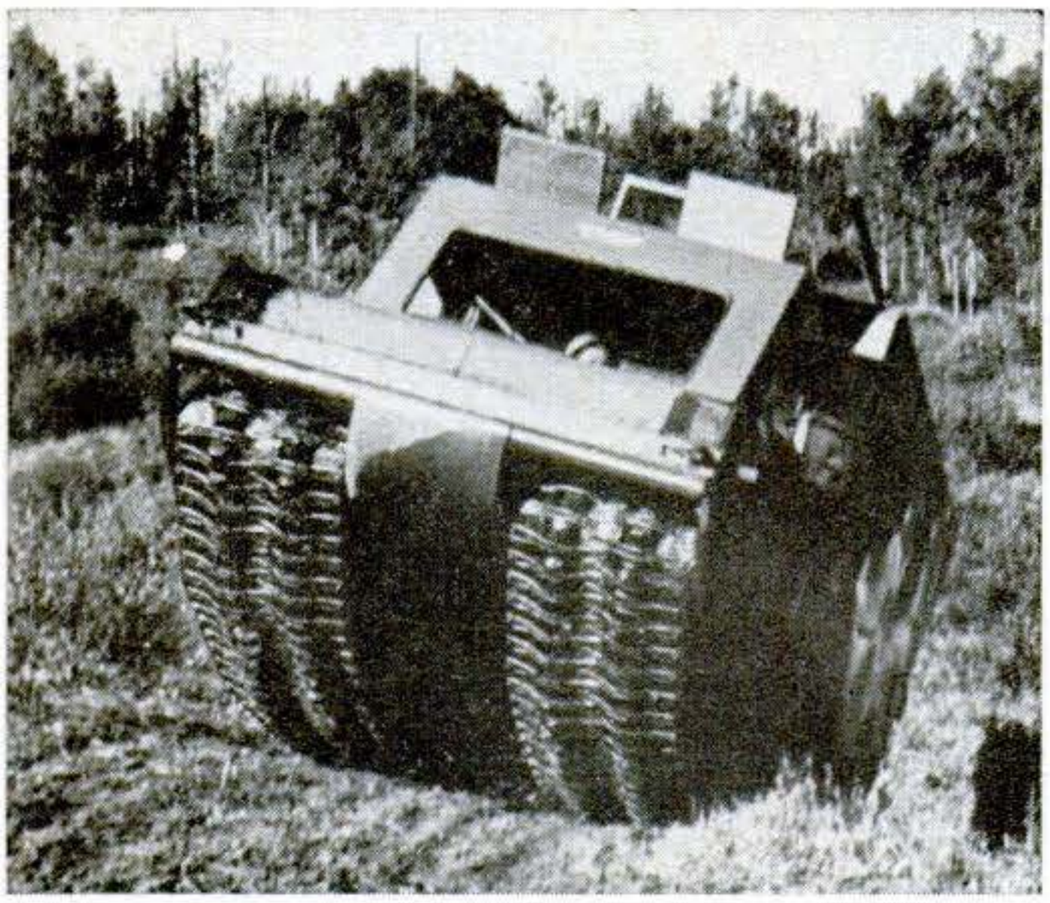
Iowa State College took up the program in 1953. It introduced the idea of wiring the driver for sound, for the public-address interview. Nebraska picked up that idea this year. The University of California's College of Agriculture began tractor-tipping demonstrations in January this year. Colorado A. & M. started them in February, Cornell in March. Similar programs are under consideration in North Dakota, Texas, Idaho and Missouri. Ontario Agricultural College heightens the excitement of the safety lessons by using a live operator instead of a dummy, protecting him with a shield that keeps the tractor from going all the way over. END





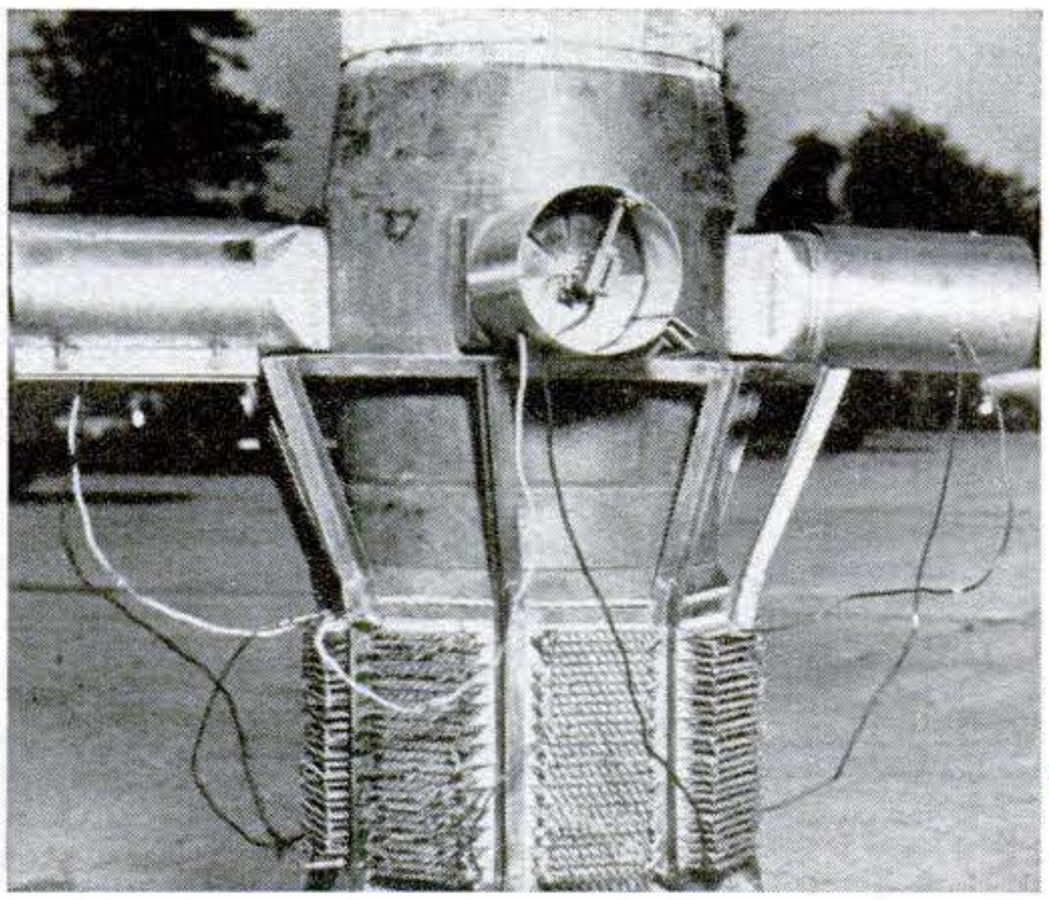
Push-Button Welder Speeds Laying of Aluminum Pipeline

ALUMINUM pipe is welded automatically with a new machine that straddles and grips the pipe. You just push a button to make the weld. When the job is done, the machine stops, reverses itself and returns to the starting position for its trip to the next joint on the gas pipeline. Reynolds Metals Co. and Air Reduction Sales Co. developed it.



Bog-Trotting Tractor Hunts Oil

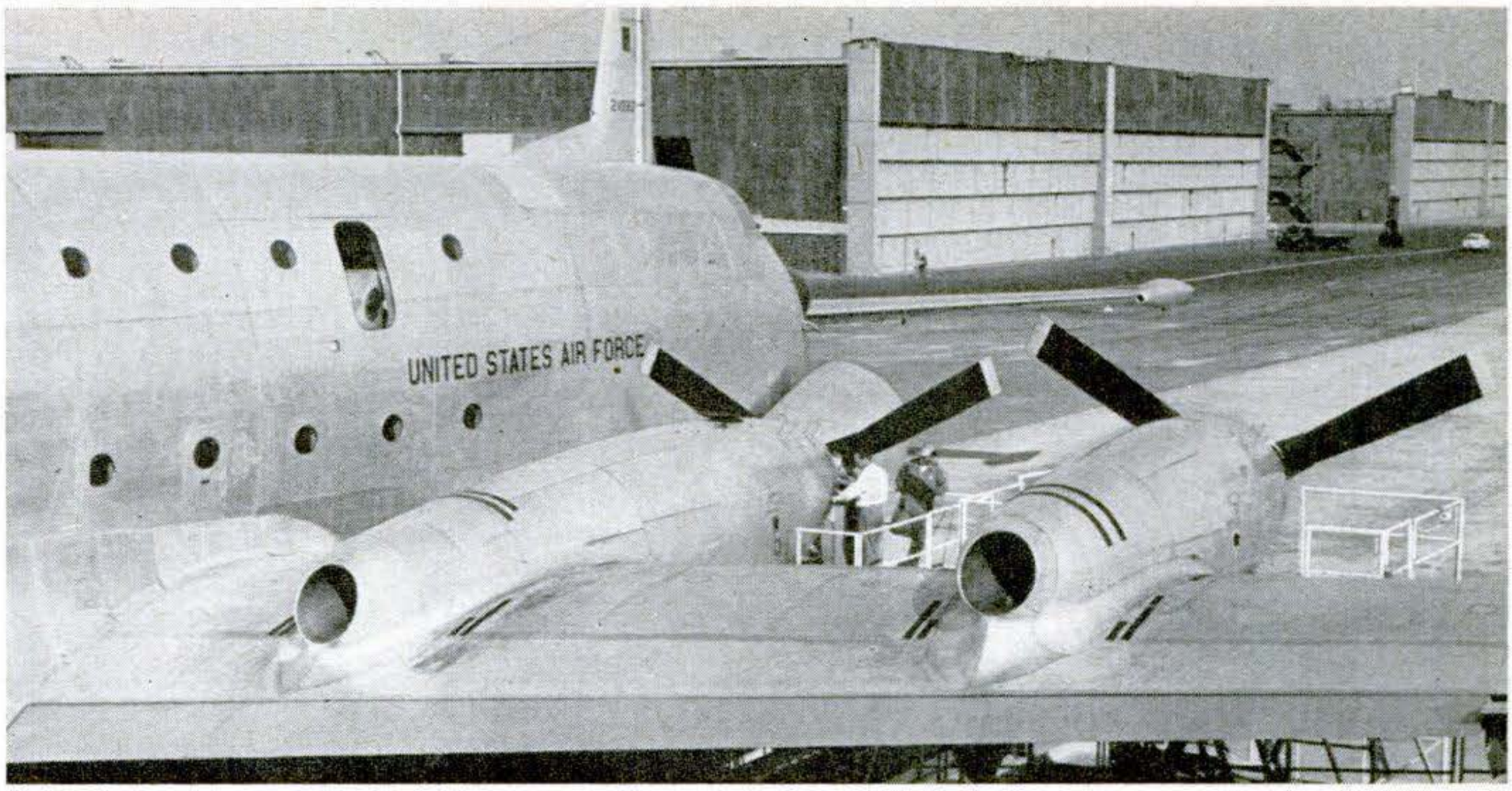
OIL prospectors will ride the tractor above in north Canadian bogs where a man can't walk without sinking. A sister of Gulf Oil's marsh buggy, it has 29-inch-wide tracks to slog over the thick, water-soaked layers of moss and dead trees called muskeg.



Furnace Powers Its Own Blowers

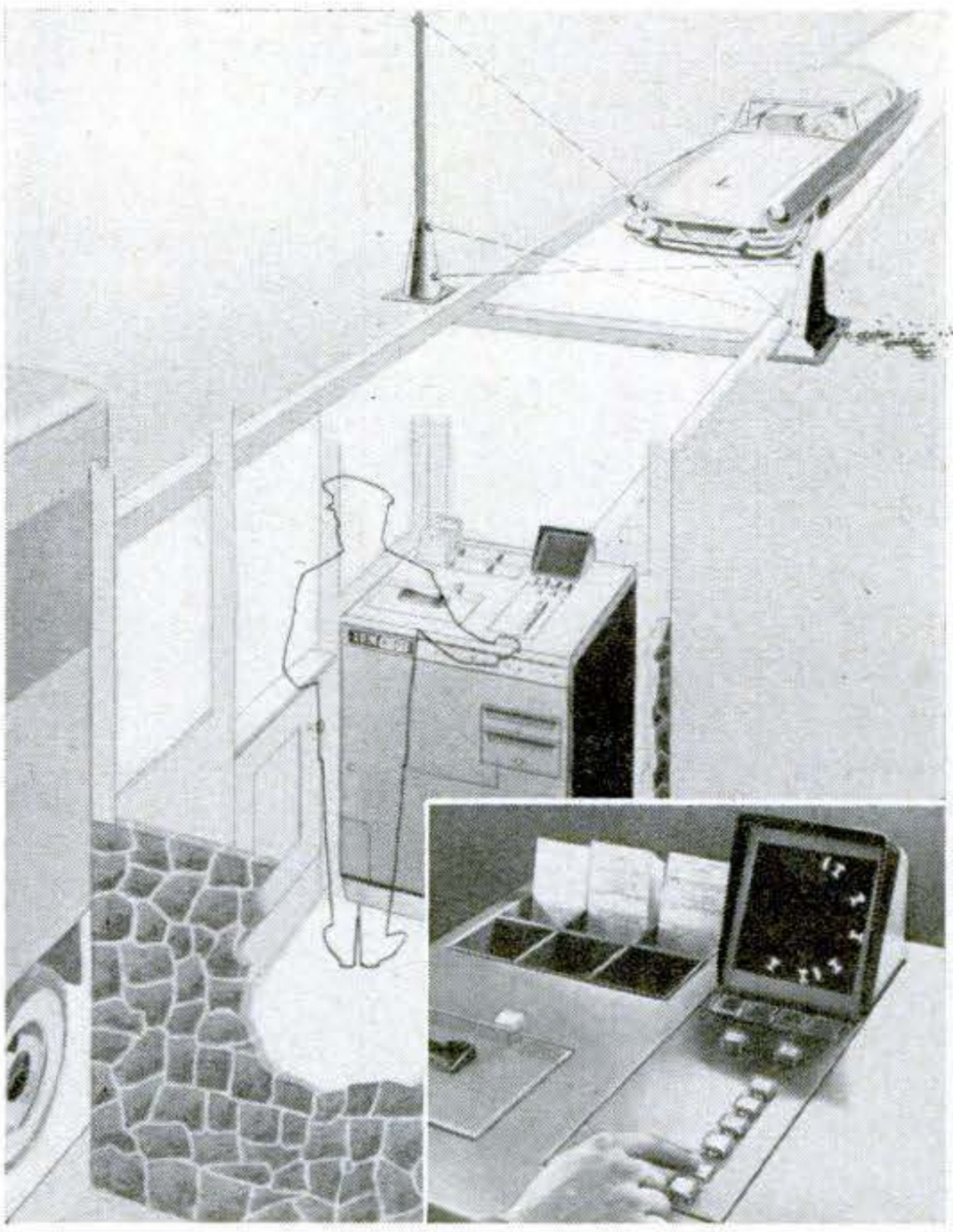
A NEW furnace not only heats air but generates its own electricity to run the fans that circulate the warm air. The trick: 2,400 thermocouples in the combustion chamber. Prof. F. J. Bordt Jr. of Rensselaer developed the self-powered unit for the Army.

Copyrighted material



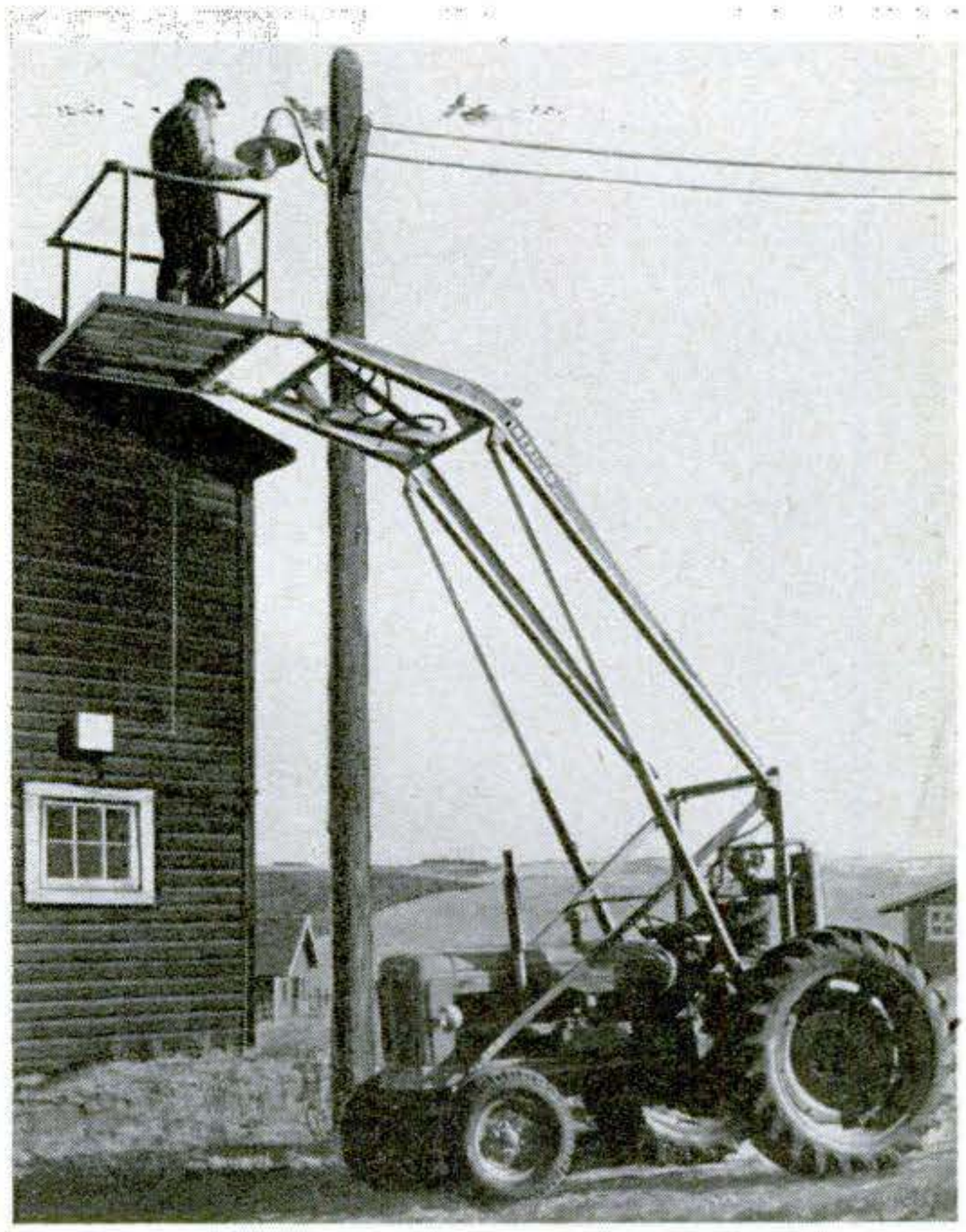
Jet Exhausts Add to Prop Power of New Air Force Transport

THE power packages in the wings of this Globemaster—the Air Force's first four-engine turboprop transport—put out 5,700 horsepower apiece. The jet exhaust scuttling out behind gets credit for a 20-percent chunk of power of each engine, a Pratt & Whitney T-34. The rest comes through the propeller, spun by the turbine.



Electric Eye to Aid Toll Taker

ELECTRIC eyes will count the axles while automatic scales weigh vehicles approaching new toll booths to be installed on the Pennsylvania Turnpike. A screen (inset) will indicate the axle count. There's also an electronic bookkeeper in the IBM setup.



Farmers Get a 25-Foot Lift

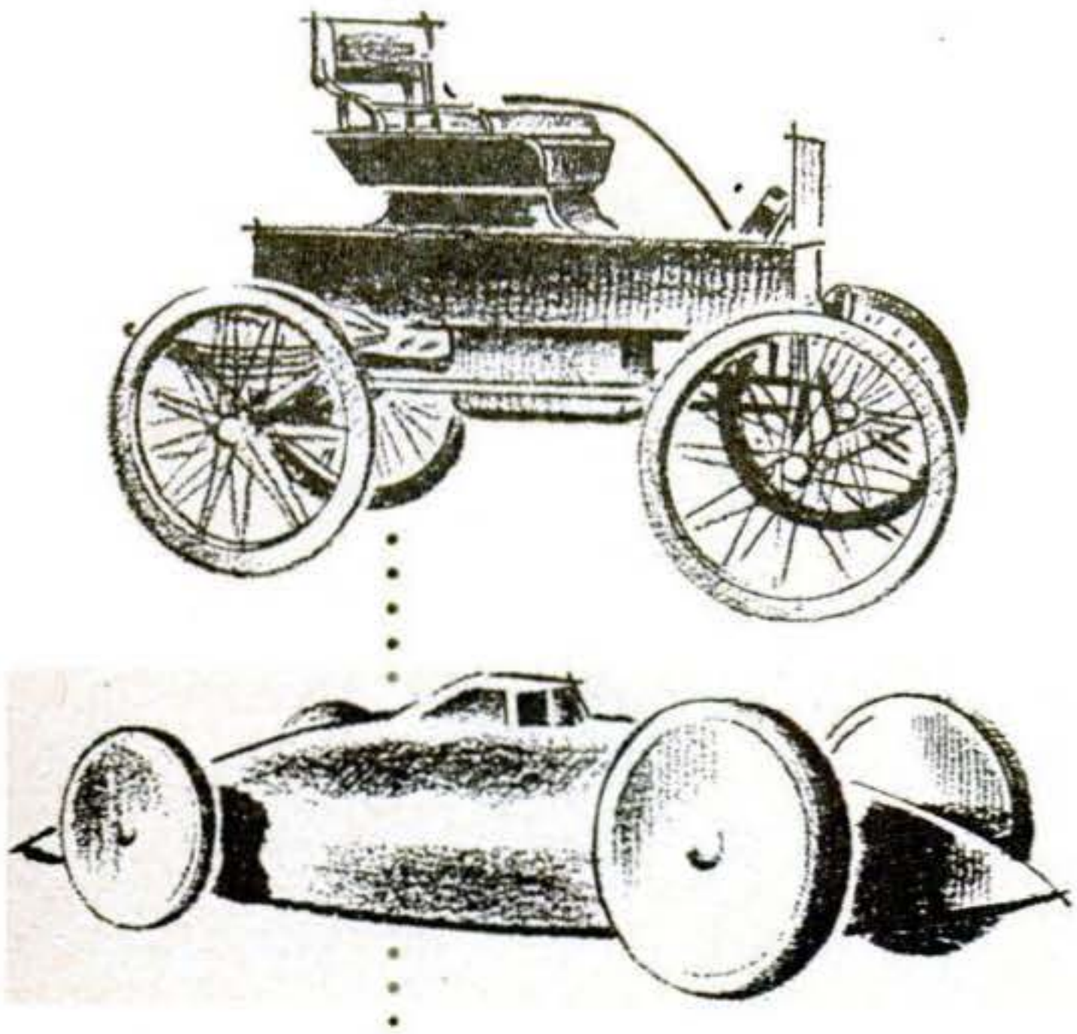
THIS tractor attachment stacks, loads, lifts or pushes. It can work 25 feet up or keep its nose to the ground with a 'dozer blade replacing the platform shown. The American Road Equipment Co., Omaha, designed it for Fordson Major tractors.

Copyrighted material

The Car That Has Changed

You wouldn't know the luxurious old Baker Electric now, but it still survives in the body of today's fork-lift truck.

By Wesley S. Griswold



THE stately and luxurious Baker electric automobile is as dead as the mustache cup, but its soul goes rolling on. In fact, it is working for a living—in complete disguise.

Essentially the same power plant that once sent sedate broughams and coupés whispering along exclusive avenues now moves silent little fork-lift trucks along U.S. factory floors.

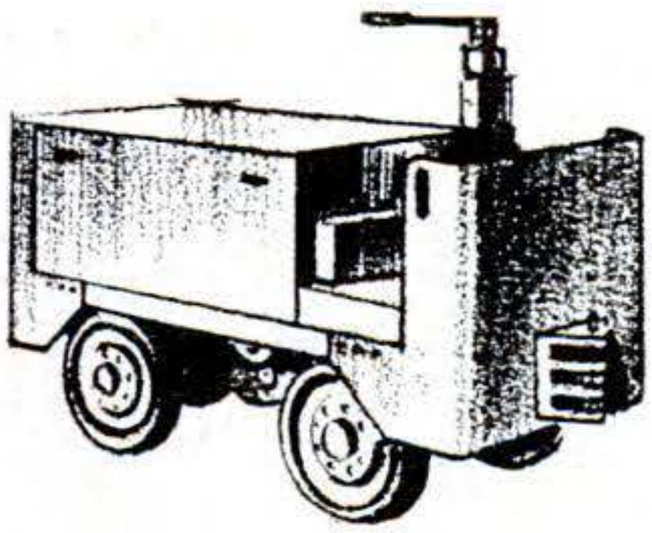
The two vehicles couldn't look less alike, but their utter dissimilarity is only skin-deep.

Yesterday's Bakers, of the untroubled half-dozen years before World War I,

the Most

were called "showcases." Through their ample windows, the envious public peered at a display of cut-glass vases, embroidered door pulls, silk window shades, rich upholstery, front seats that swiveled, cigar lighters, vanity cases and sometimes electric fans and foot warmers.

Today's Bakers are strictly work horses. They have been stripped of every fixture not essential to heavy duty and have been fitted with powerfully developed hydraulic muscles. With these, and an extensive variety of attachments, they pick up, push, roll, hoist, stack, load, unload, twirl and dump the



THE STRANGE FAMILY TREE of the Baker Electric stems from the plain-Jane horseless carriage, made in 1898, shown in the top drawing on the opposite page. Out of this, in 1902, developed Walter Baker's record-breaking, ill-fated electric racer, the Torpedo, shown in the sketch beneath. By 1914, as the photo at left shows, the electric passenger car was in its full glory. The sketch directly above is of Baker's first electric materials handler, produced in 1920. At right is its rugged, highly versatile descendant, a hydraulic, fork-lift truck. The power plant of these five outwardly dissimilar vehicles has been essentially the same for 56 years.

raw materials, finished products and wastes of hundreds of American industries.

Yet the fat Baker of the past and the lean Baker of the present have these fundamentals in common:

- Straight-type, top-mounted worm drive.
- Batteries of practically the same voltage.
- Motors so nearly alike that most of the parts numbers have not been changed in more than 40 years.
- A single lever to govern forward and backward movement and speed, by controlling the amount of resistance between battery and motor.

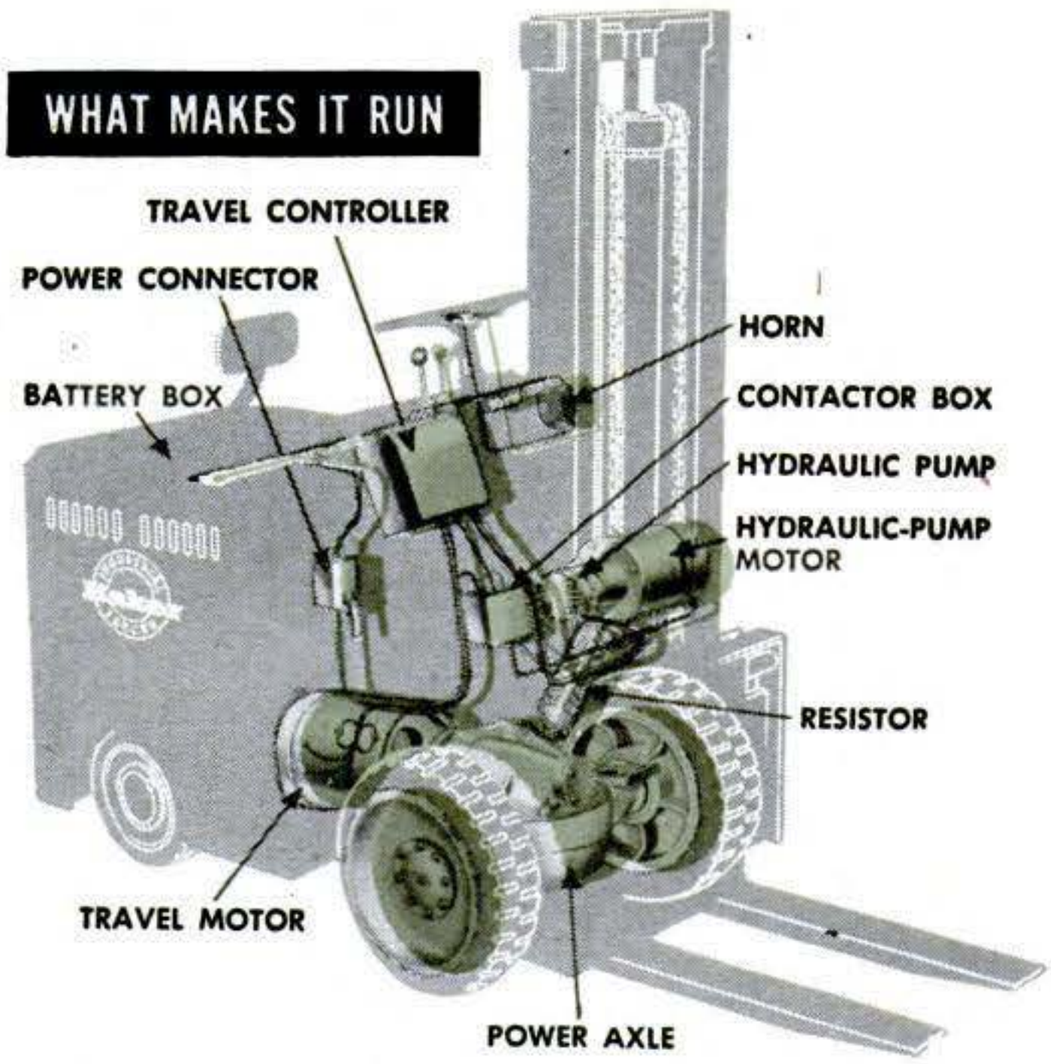
From Luxury to Lager

The principal difference between the vitals of the two vehicles is that the ampere-hour rating of the old-time battery was an anemic 200 to 225 per cell. The ampere-hour rating of today's battery is a robust 450 per cell.

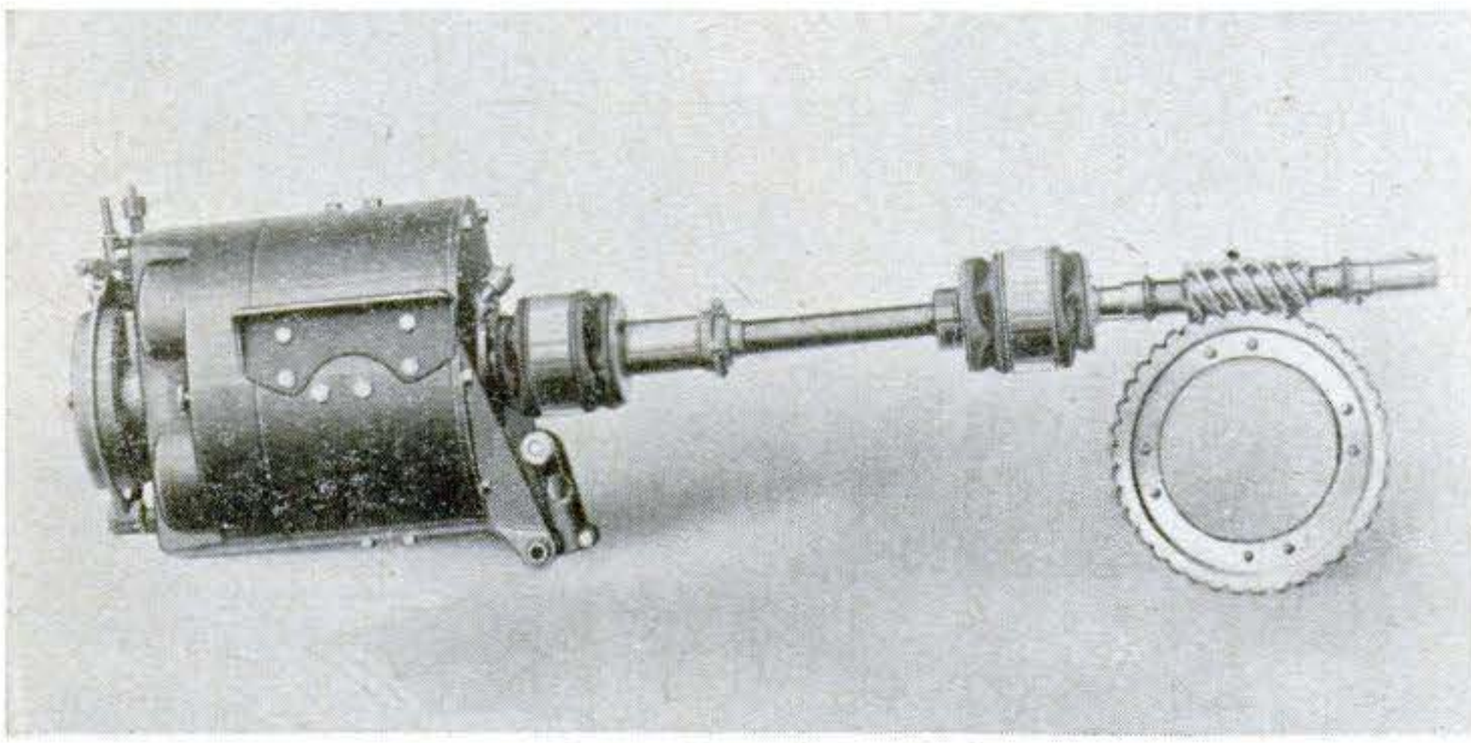
The original Baker Electric has gone through as many reincarnations as a Buddhist's great-grandmother. After its initial existence of luxury and ease, it next turned up in brewery trucks, express vans, ambulances, police patrol wagons and even fire trucks. Then came a brief and giddy life with a gasoline engine, in the innards of the rich and rare Owen Magnetic car. Finally, in a fourth existence, it took the humble form of an industrial truck, a materials handler. That was about 37 years ago, and it has not changed much in looks since then, though its versatility has grown mightily.

Walter C. Baker, then 30, produced his first electric car in Cleveland in 1897. It could travel only 20 miles on a single charge and was about as stark a version of a horseless carriage as could be imagined. A 10-cell battery, arranged in two trays, was hidden under the buggy seat. A three-quarter-horsepower motor bulged slightly below the floor. A single chain ran from the motor to a sprocketed wheel mounted on the rear

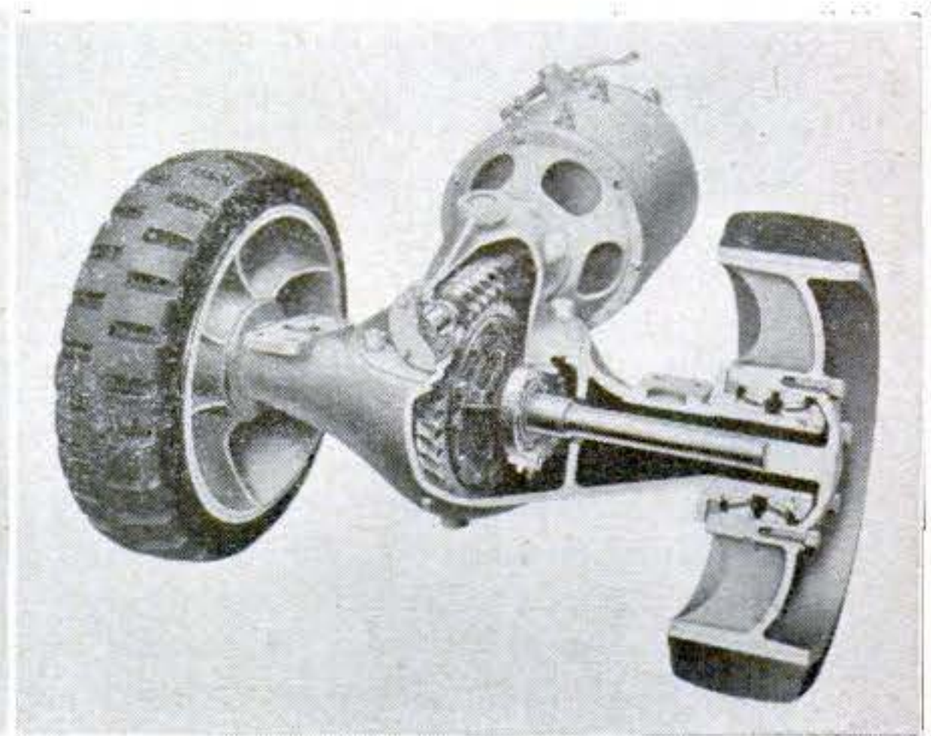
Inside a Work Horse:



AS IN THE OLD DAYS, what makes a Baker electric vehicle run consists of battery, controller, resistor, motor and worm drive.



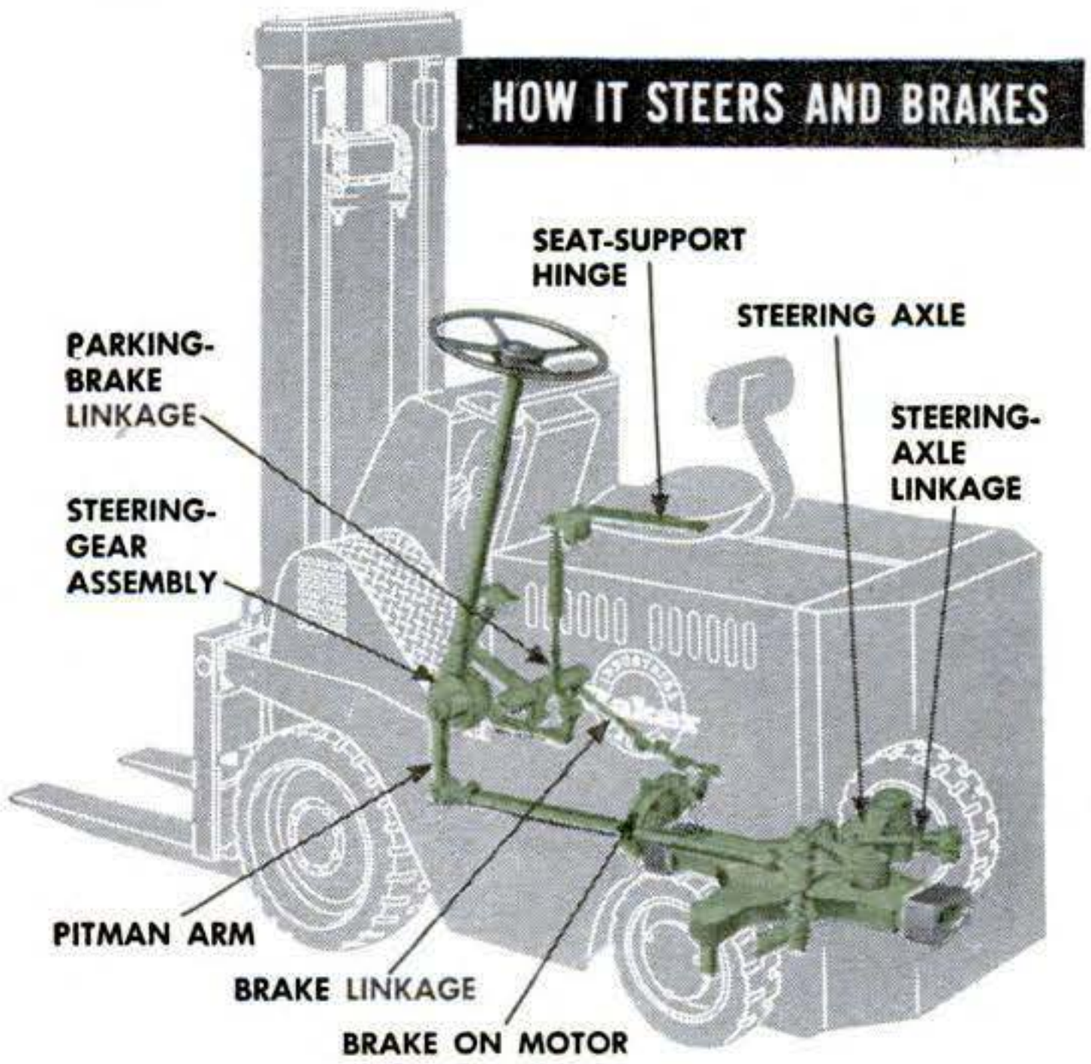
WORM-GEAR DRIVE was introduced in Baker electric passenger cars about 40 years ago. Above are its essentials, as they then looked.



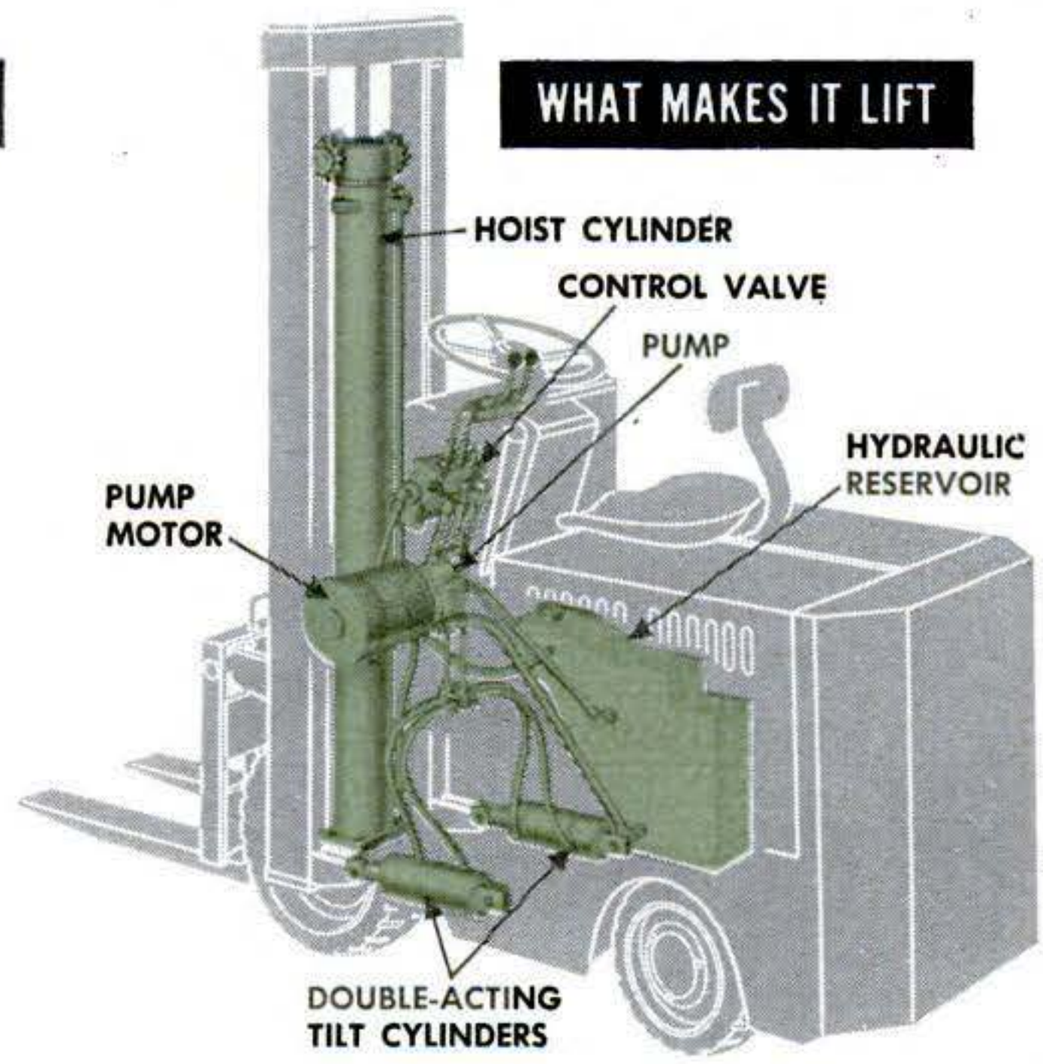
THE WORM STILL TURNS the driving axle of a Baker Electric (above, right). For the fork-lift truck, the assembly has been telescoped.

Copyrighted material

How a Fork-Lift Truck Does Its Job



WHEN THE OPERATOR GETS UP, nobody can move the fork-lift truck. The seat then tilts forward and automatically sets the brake.



MUSCLES FOR MANY TASKS are controlled by metering, which allows the operator to govern lifting, lowering and clamp pressure.

axle. The 550-pound car was steered, in the manner of a child's express wagon, by a tiller extending straight at the driver from the center of the dashboard.

For the first three years, this model was not strikingly improved. Still, it charmed Thomas Edison and his wife, who came to Cleveland to buy one in 1901.

Torpedo Is Pointed at Both Ends

Baker and his electric car did not become well known until May 31, 1902, when together they were involved in a fatal accident and made tragic and spectacular headlines. Like many other automobile builders of the day, Baker had constructed a racer to advertise his product. The Torpedo, as it was called, was an extraordinary car, years ahead of its time in design. Slightly more than 18 feet long, less than four feet wide and far lower than its competitors, the racer was sharply pointed at both ends and looked like the hull of an overturned sailboat.

The Torpedo's body was made of white pine and basswood, covered with black canvas. The huge wheels had wire spokes, hidden by canvas shields, and wooden rims. The tires were inflated to 125 pounds' pressure.

Baker and an electrician huddled on hammock canvas seats, one in front of the other, in the center of the hull. Only the tops of their heads were visible, under a low canopy skirted with isinglass.

The Torpedo's single motor was mounted behind the men and drew its power from a 40-cell battery divided into eight sections, which were distributed around the interior of the hull. Two chains ran from the motor to sprockets on the rear axle.

Tragedy Stalks Racer

On the afternoon of May 31, 1902, in the course of speed trials held by the Automobile Club of America on Staten Island, N. Y., Baker's Torpedo leaped out of control at 78 miles an hour on a bend in the nearly straight macadam course and slammed into the crowd. One man was killed and nine other persons, one of whom later died of his injuries, were hurt. A bicycle that got in the way was

Copyrighted material

cleanly cut in two. The Torpedo's body lay pried from its frame like the lid of a crudely opened tin can, but its occupants luckily were unharmed.

Although the Torpedo was repaired, Baker seldom raced it again.

Henry Ford Liked the Baker

Bad publicity crimped Baker's sales of his more conventional electrics for a short time after the Torpedo ran wild, but the quality of the car soon won it many admirers.

Ford, then producing a large, gasoline-powered, six-cylinder model, was heard to remark that he wished he could build a car as well made as the Baker. Diamond Jim Brady owned a Baker, and the King of Siam ordered a special runabout. It had pigskin seats and an ivory tiller. The body was painted white with gold trim, and the royal crest decorated each side.

The electric passenger car was essentially a woman's car, because it was so quiet, clean, safe and easy to operate. It had approximately as many moving parts as today's electric fork-lift truck—fewer than 20. A lever attached to the left wall of the car governed the speed and determined whether the car went forward or backward. It was called the controller, and moved in the same plane as today's hand brake. In the models of the electric's heyday, the controller provided six forward speeds, ranging from about four miles an hour to 20, and three reverse speeds.

On the top of the controller handle was a button. This rang a bell or sounded a klaxon, depending on how forceful a person the owner was. The driver steered by pushing or pulling on a tiller that extended horizontally across his lap from the left wall. (Walter Baker claimed to have originated the left-hand drive.) The tiller could be folded straight up against the wall when the car was parked.

Lightning Getaway—20 M.P.H. Speed

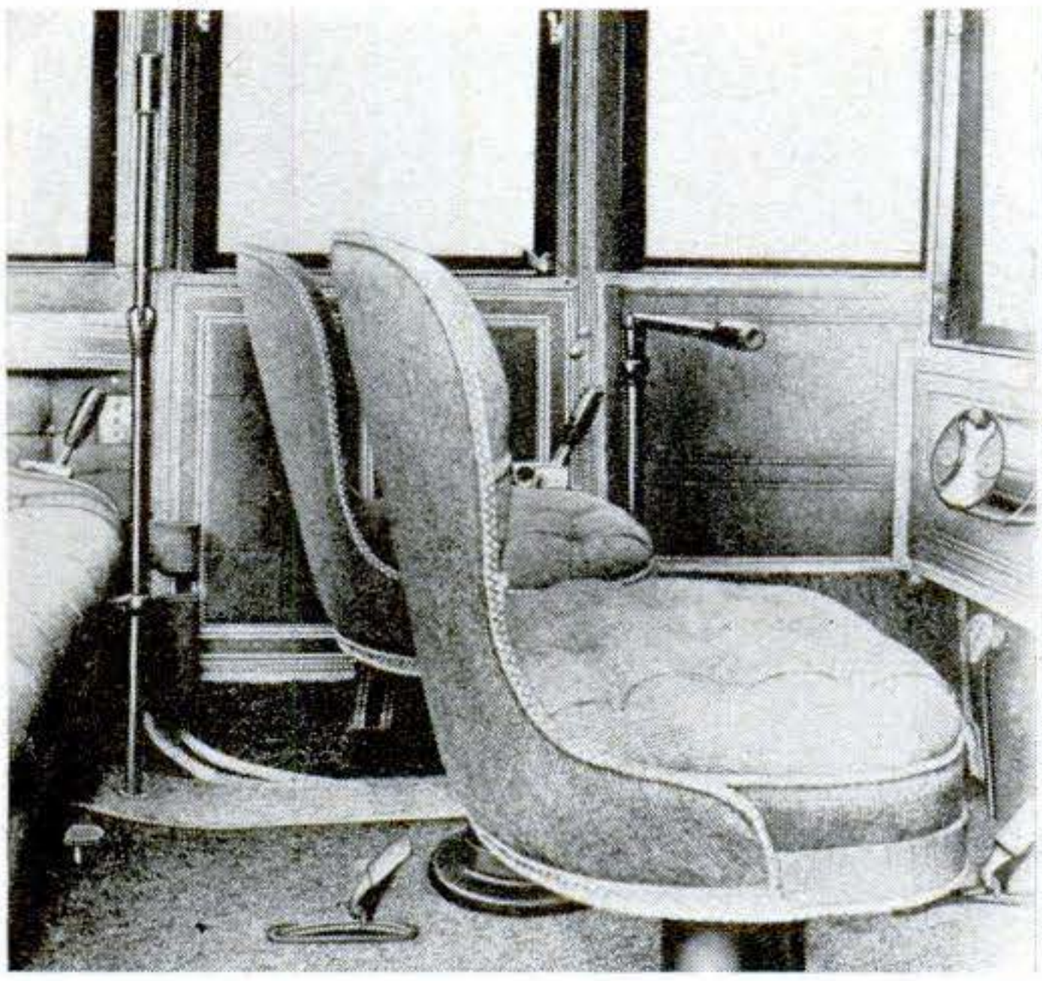
The last few models of the electric car replaced the tiller with a steering wheel, if the buyer requested it. The controller then was mounted on the right side of the steering post.

The Baker Electric, in its best years, had a remarkably fast getaway. But, quick as it was to attain full speed, its maximum effort was rarely more than 20 miles an hour. And much emphasis was placed on taking advantage of gravity.

"Always coast on down grades," a Baker book of driving instructions advised.

Before the elegant electric deigned to become a drab bomb handler, in 1917, it

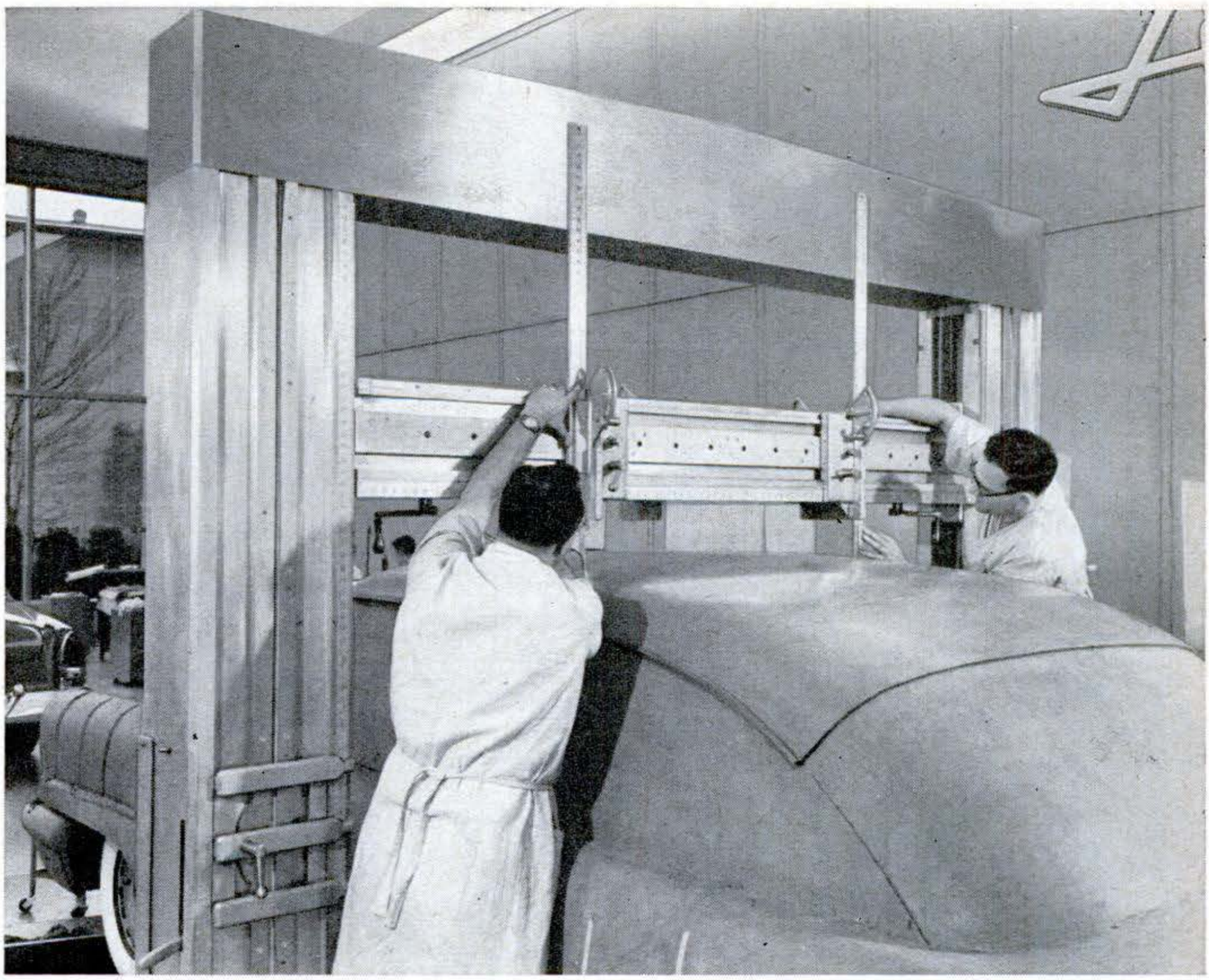
[Continued on page 252]



BACK-SEAT DRIVING was the rule in electric passenger cars. This late Baker (1915) provided a duplicate set of controls in front.

GRANDFATHER OF FORK-LIFT TRUCKS was this shell handler, with exposed innards, that Baker built for the U. S. in World War I.

Copyrighted material

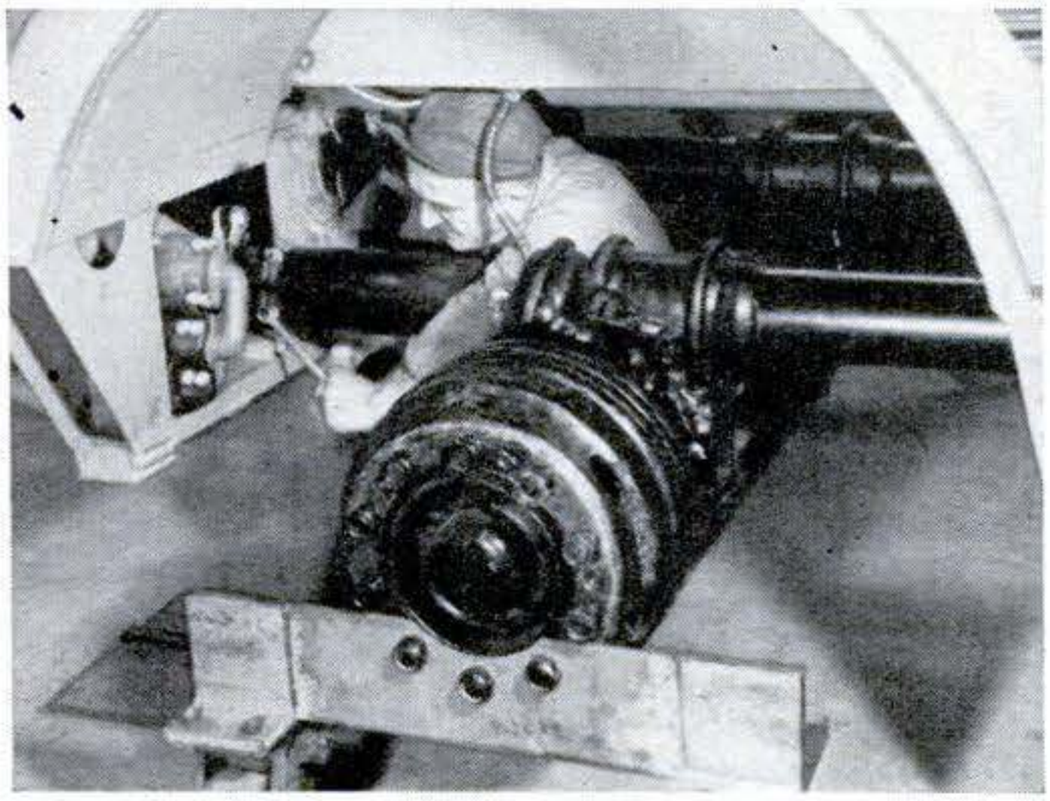


Giant Mobile Calipers Help Sculpture Next Year's Automobiles

CALIPERS big enough to span a car help engineers build full-scale clay mock-ups for new models. Accurate to 1/10,000 of an inch, the crosspiece can be raised and lowered at any angle to transfer a designer's dimensions from blueprint to clay. The "modeling bridge" rides tracks laid on the floor of the Ford plant.

Bus Rides on Rubber Springs

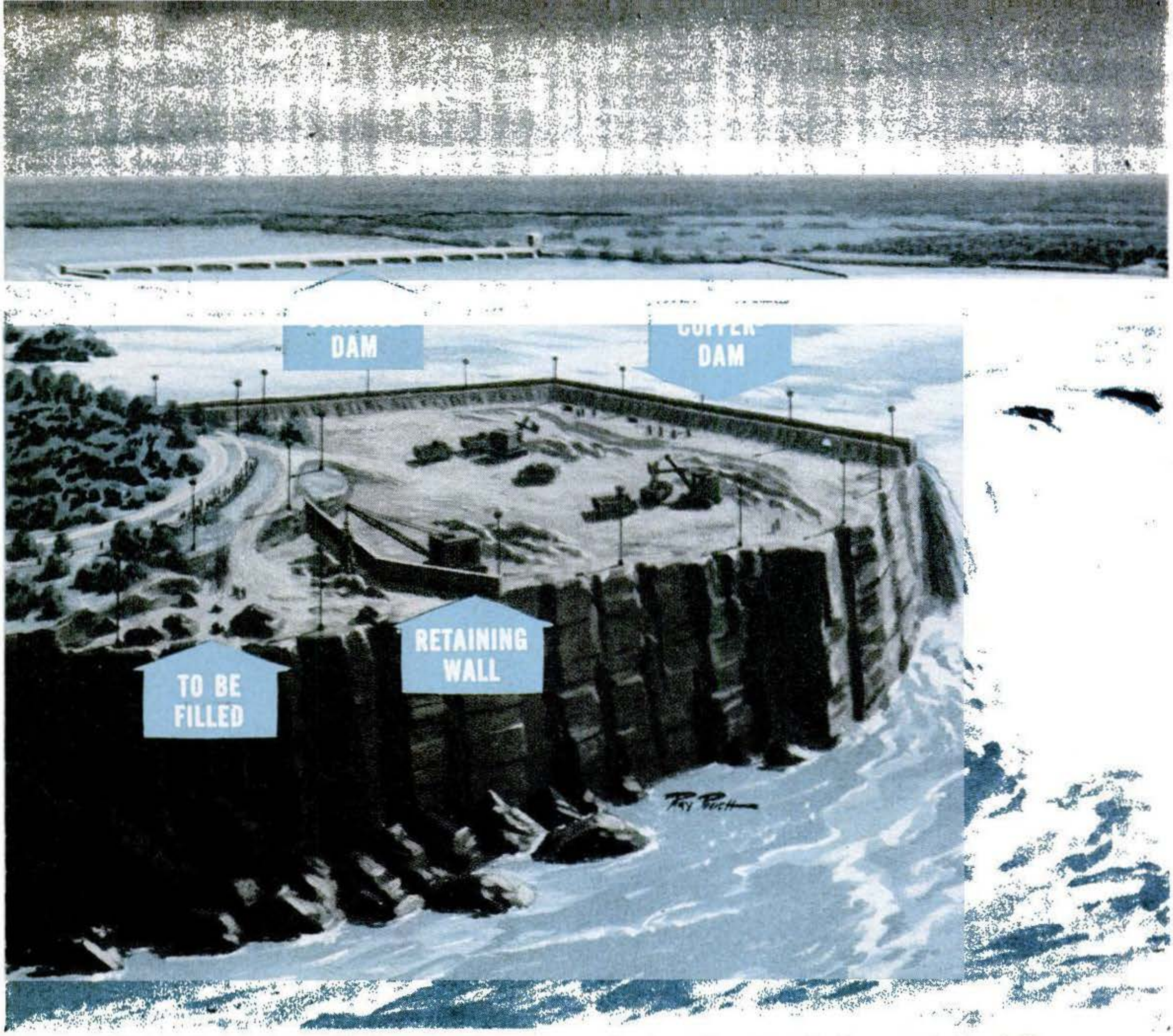
RUBBER bonded between a metal shell and a central shaft forms a new bus spring. One part turns while the other stays still. The twisting, "wind-up" movement in the rubber makes riding easier, says Goodrich.



Air Gunners Get Plastic Target

PROBLEM: A tow target capable of withstanding the crushing, frigid clutch of high altitude while being towed at supersonic speed. Answer: The plastic XM-24 above. Bellanca, which developed it, says it won't shatter when hit by shell fragments. A parachute floats it gently to earth to train gun and radar crews another day.

Copyrighted material



To save Niagara's sagging old face, engineers are altering the river bed around the falls.

V-shaped area encloses the view seen above.

Rock surgery will restore newlyweds' favorite falls, now badly showing its age.

By George H. Waltz Jr.

VISITORS to Niagara Falls these days are getting, besides the standard view of one of the world's great natural wonders, a grandstand seat for a feat of engineering know-how and daring that has

Copyrighted material

They are excavating and filling behind cofferdams, and building a permanent control dam.

never before been attempted anywhere.

Among other things, it involves rearranging the solid shelf of rock just back of Horseshoe Falls' crest to restore and preserve its beauty. To do this, construction men—boom operators, 'dozer drivers, dragline handlers, drillers and dynamiters—are working literally in the midst of the tumbling waters of the Niagara River cascades.

At times they are just a few feet from the exposed lip of the falls, with little but a hand line between them and the gorge, 160 feet below.

By the time the job is done—in 1957—Canadian and U.S. workmen will have drilled more than 20,000 blasting holes, used more than 60,000 pounds of dynamite and removed some 500 million pounds of rock from the river bed above the falls. The falls, according to the engineers, will be prettier than they have been for years.

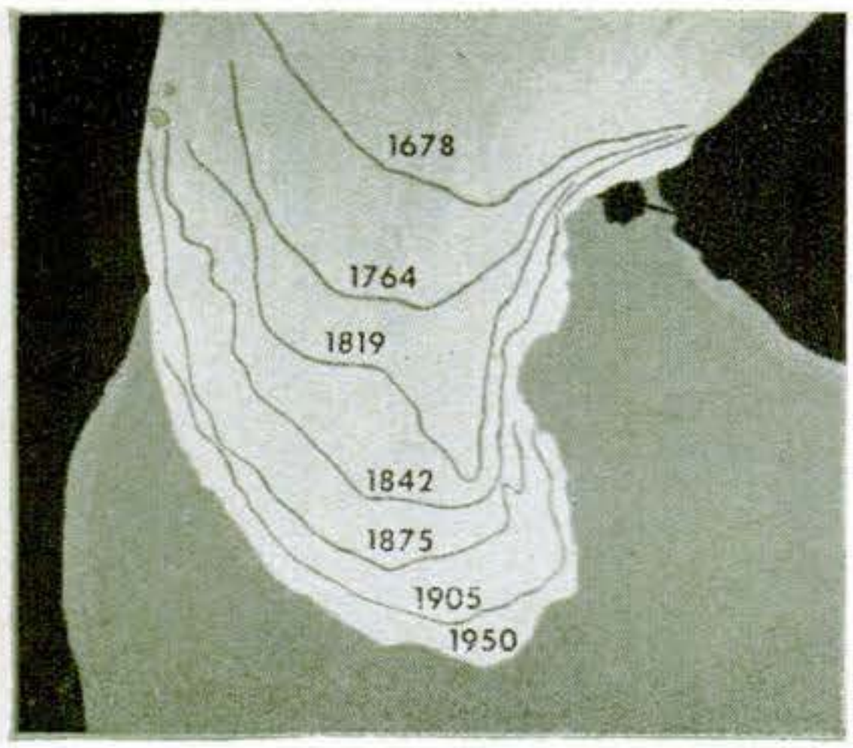
For some time now, Niagara's beauty has been fading. The continuous eroding action of the more than 300,000 cubic feet of water that plunge over the brink every second has gradually deepened the bend in the Horseshoe Falls.

Falls Are Moving Upstream

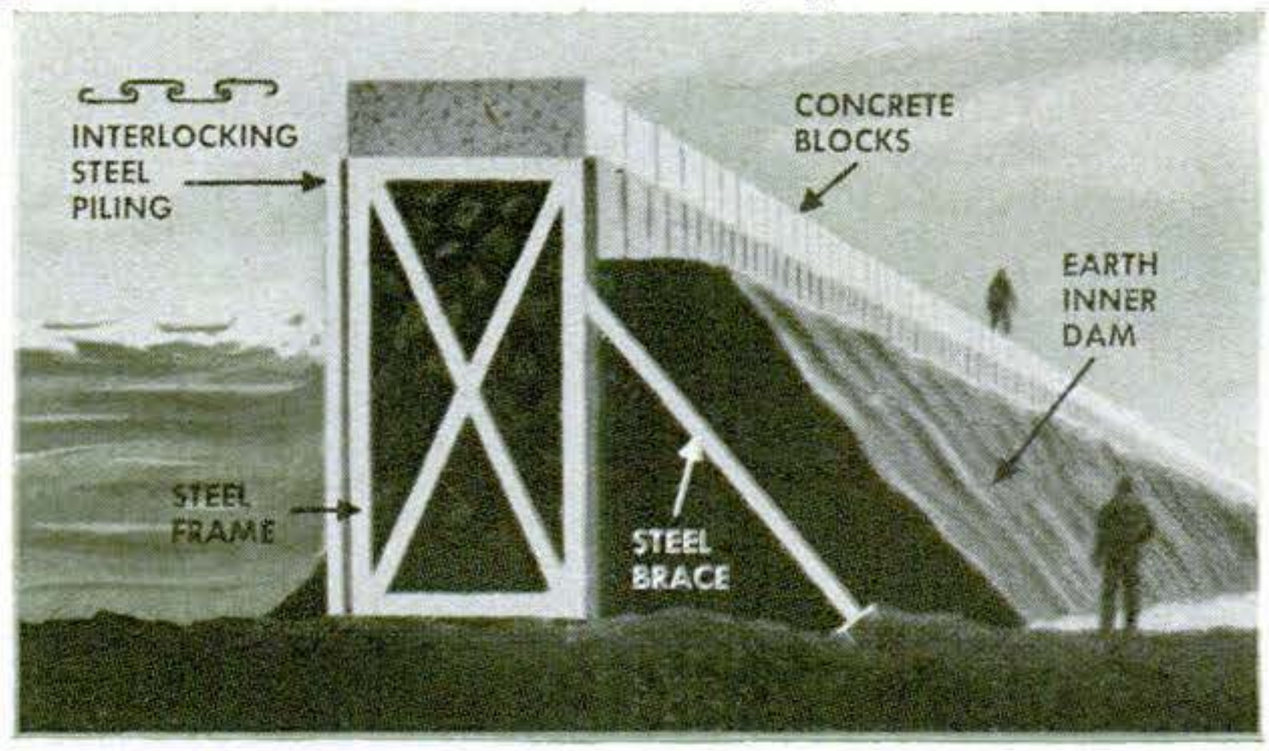
At the central point, along the boundary between the U.S. and Canada, during certain periods the hard dolomite rock lip has been worn away as much as five feet a year. In the 276 years since the falls were first surveyed, the inner arc has been eroded back, moving upstream

Copyrighted material

This is how engineers will create a dry place to work.



EROSION over the centuries since its contours were first recorded has cut back deeply into the lip of Horseshoe Falls. Engineers will slow this.



HUGE COFFERDAMS, constructed right in the midst of the swirling waters of the cascades, will allow workers, dry-shod, to build the control dam upstream and to do the required excavating and filling at the falls.

toward Buffalo, as much as 1,300 feet.

Even more damaging to the scenic effect is the fact that the erosion has funneled more and more of Niagara's water toward the Horseshoe's center and away from the Canadian and U.S. ends, where in spots it has been reduced to trickles. Besides giving the falls an untrimmed, gap-toothed look, the uneven distribution has robbed the spectacular wall of water of its once-famous deep aquamarine color.

In 1950, both Canadian and U.S. experts decided that something should be done about it. The extensive, $17,000,000 face-lifting operation started late last summer and will continue around the clock and around the calendar, winter and summer, until it is completed.

$14,000,000 Worth of Gates

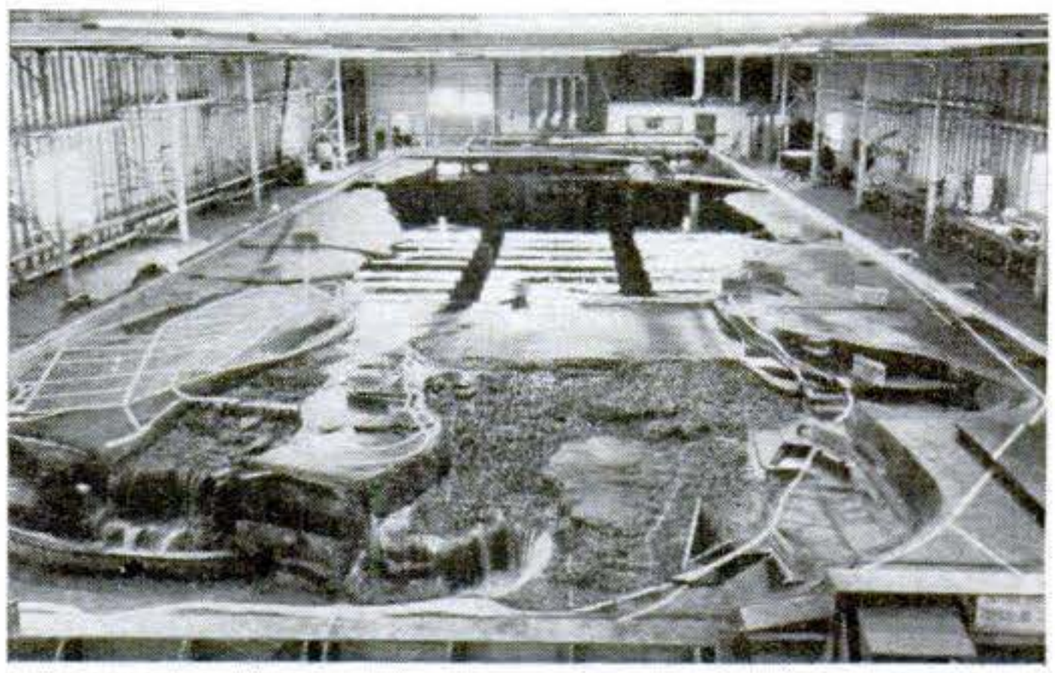
Basically, the beauty treatment consists of three major construction projects.

The most expensive is a $14,000,000 control dam. Jutting out into the river for 1,500 feet from the Canadian shore, about a mile above the falls, the dam, with 13 individually controlled gates, will make it possible to divert and balance the flow of water to provide an even distribution over the falls at all times.

Unlike most water-control works, whose gates lift or swing up, these gates will be hinged at the bottom and will tilt toward the falls when they are opened. When ice jams fill the river, the gates will be tilted down just enough to skim off the surface ice without interfering with the desired distribution of water.

Once the dam has redistributed the water as desired, excavations and fills at the flanks of the falls will guide the water toward the crest in an even flow. To preserve the beauty of the tumbling cascades above the falls, these large excavations will be literally sculptured into the rock, to duplicate as nearly as possible the natural, uneven contour of the river bed as it exists today. In effect, the river bed will be the same, only deeper—in spots, as much as 9½ feet deeper.

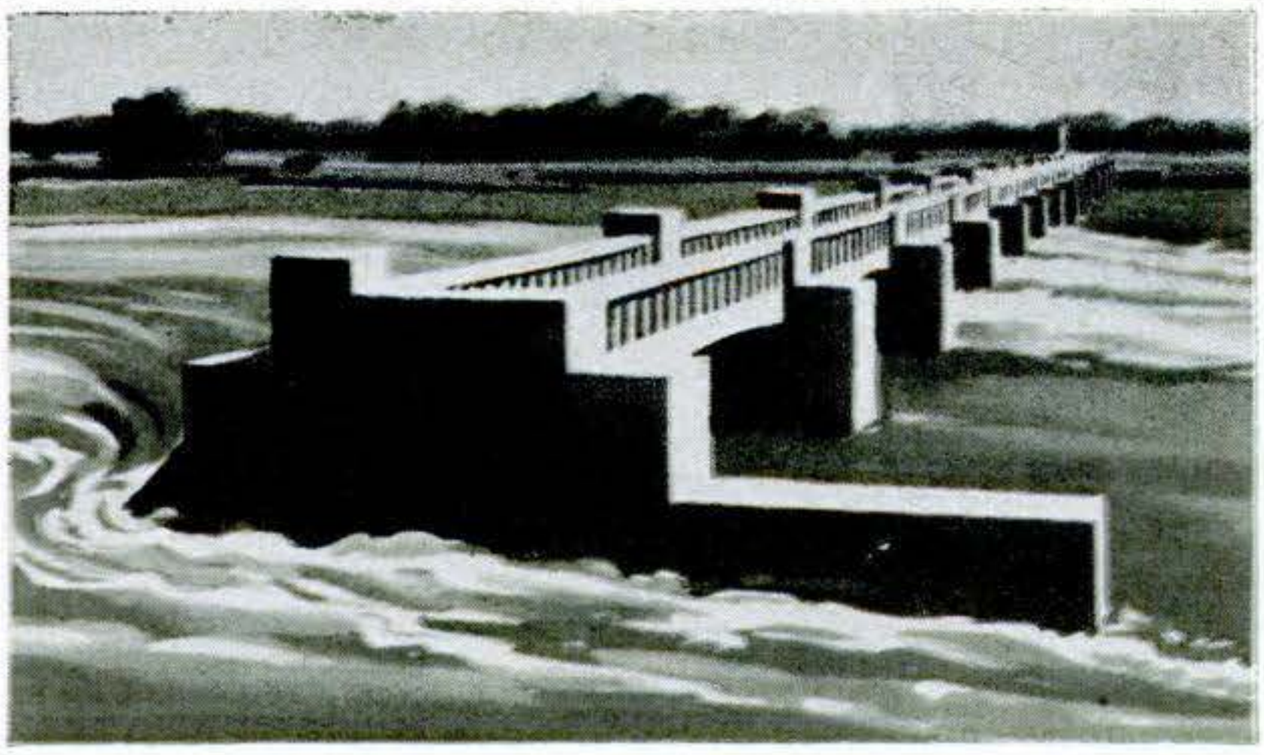
To hold back the churning torrent of water that often speeds over the crest at close to 25 m.p.h., stout cofferdams—watertight enclosures—are now being



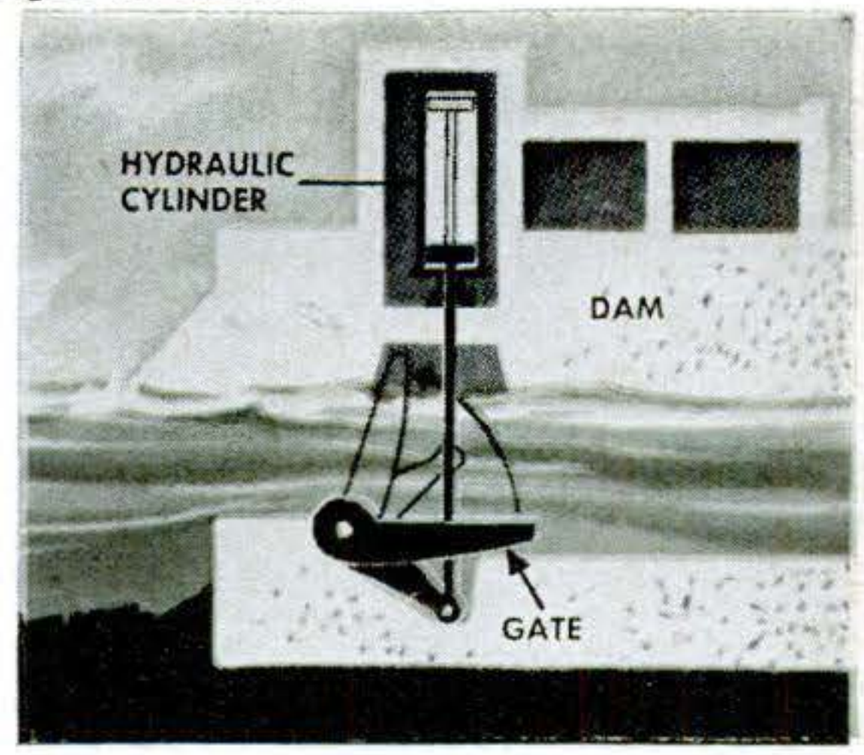
PRELIMINARY RESEARCH for the face-lifting project was carried on by means of this elaborate scale model of the falls at the Ontario Hydro-Electric Laboratory, Islington, Ont.

Copyrighted material

This is how the falls' lifted face will be kept fresh.



CONTROL DAM being built about a mile above the falls will serve as a giant faucet. It will govern the flow of water not only for the beautified waterfall but for additional plants of the Niagara power project.



DAM GATES will be hinged at the bottom and operated by hydraulic cylinders. Ice pressure of 250 tons will open them automatically.

built around areas where major surgery is planned.

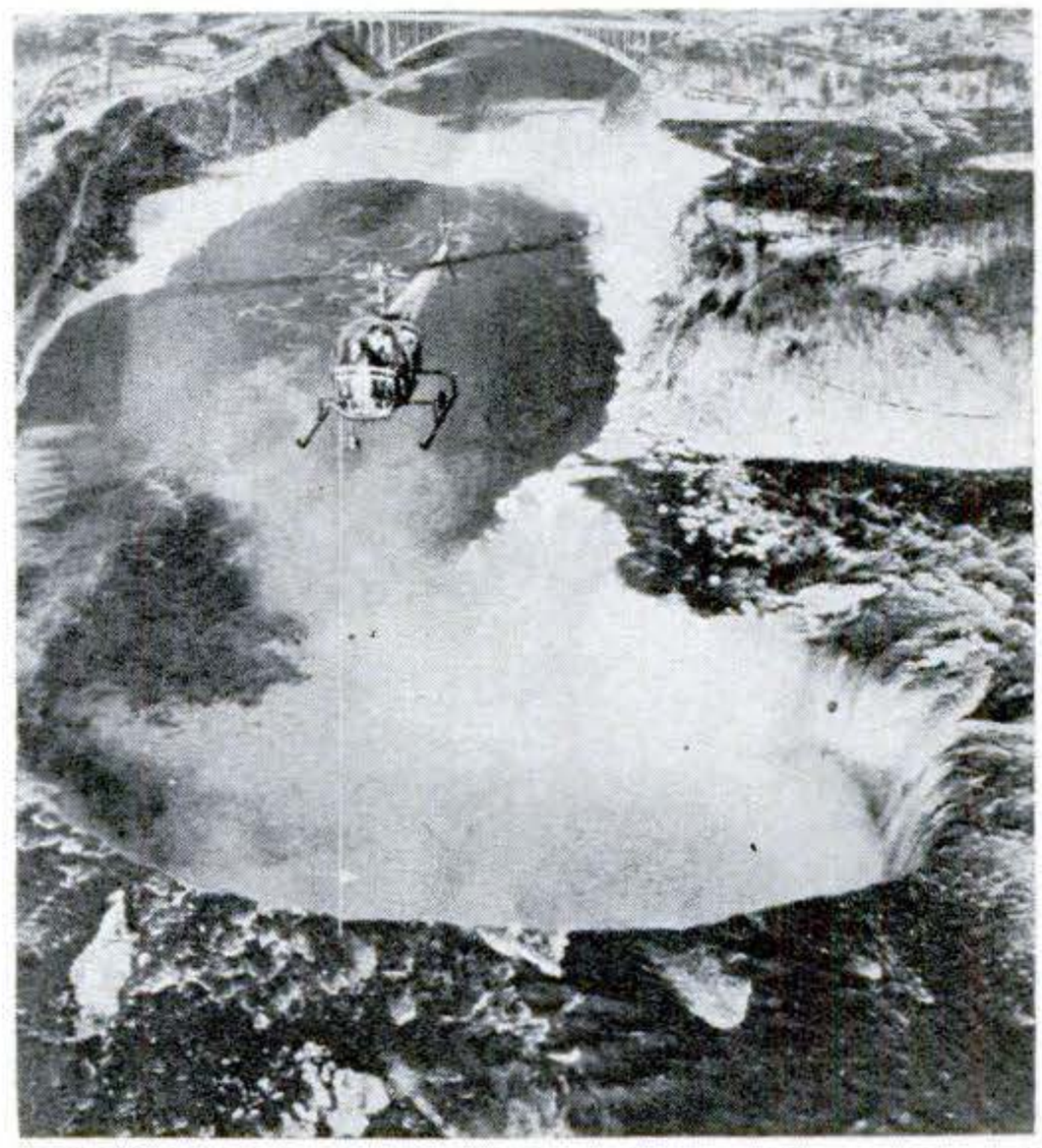
These cofferdams are being built strong enough to hold off water that will be surging against them at impact pressures as high as 1,100 pounds per square foot. Moreover, since the solid rock bed of the Niagara River makes it impossible to drive in piling to get anchorages, the dams will be held in place by sheer weight. Mammoth concrete blocks, weighing almost as much as a diesel locomotive, will be stacked on each 10-by-30-foot section.

Giant Braces Will Support Coffers

When a dam has been built to surround a desired area completely and the water had been drained off (or pumped off, in the case of the control-dam area), the coffers will be strengthened on the inside with dirt-and-steel angle braces fastened to the river-bed rock.

If present plans work out, sidewalk superintendents who visit the falls during the next few years will get special treatment. There will be no need to peek over board fences to get a look at the work. On the American side of the falls, the U.S. Army Corps of Engineers—which, under the direction of Col. Phillip Garges, is in charge of operations on this side of the border—is already constructing special viewing ramps and exhibits that will explain the work.

At the famous Maid of the Mist House, maps, models, drawings and movies will explain the job from beginning to end. Attendants will be available to answer questions. On Goat Island, at the American side of Horseshoe Falls, spectators will be allowed to stand almost at the

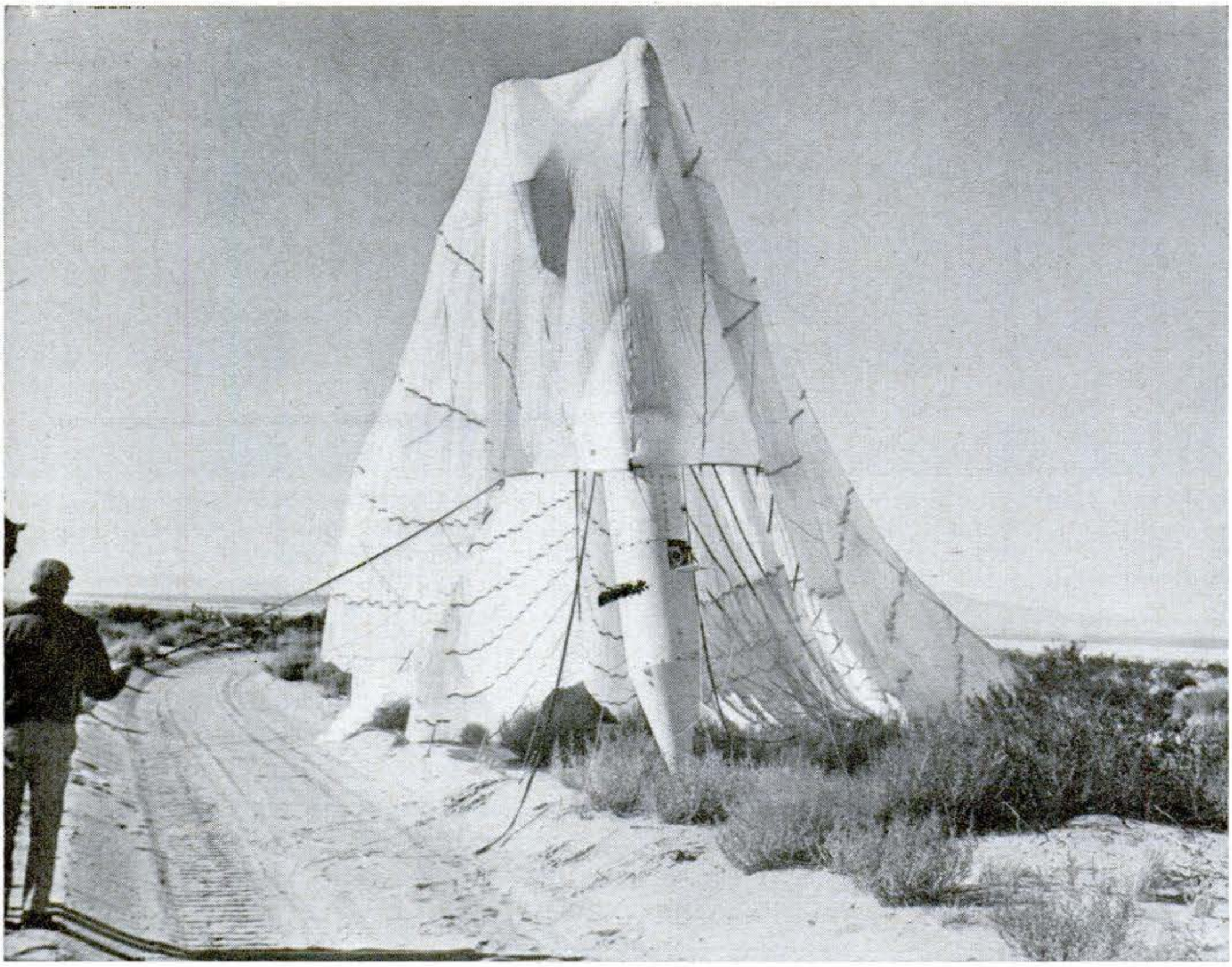


SOUNDING OPERATIONS at the perilous rim of Horseshoe Falls, essential to the engineers' plans, were conducted by lowering the gear from a helicopter hovering overhead.

edge of the excavation area and within a few hundred feet of the giant cofferdam itself.

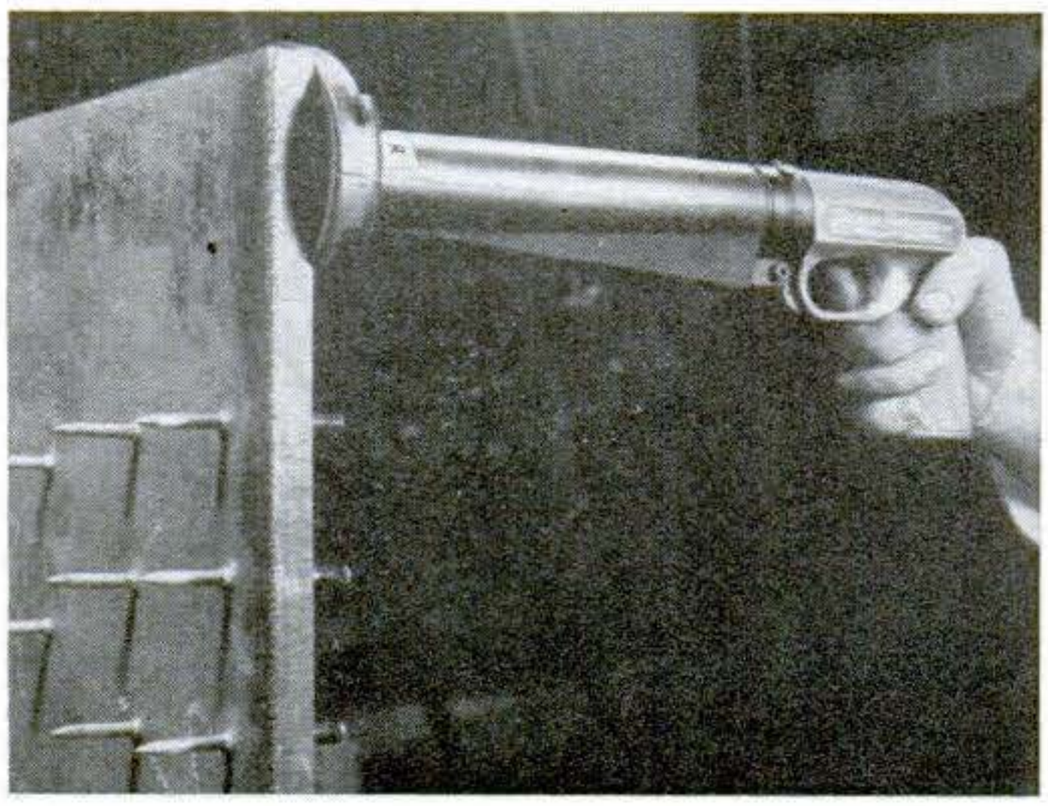
Engineers say that it's worth getting married, just to see the spectacle. END

Copyrighted material



Peaceful Missile Nose-Dives from B-29 to Test Parachute

THE missile above has just plummeted to earth to test a parachute. As the chute blossomed from one fin, a high-speed camera in another fin took movies of its performance. A crane will yank Cook Research Labs' Skokie from the Mojave Desert sand—it is stuck on its long nose spike—for another drop from a B-29.



Pistol Shoots Spikes into Steel

FOR builders—not cops or robbers—this pistol shoots fasteners into concrete or inch-thick steel plate. Its powder load will pound home pins and studs ⅜ of an inch in thread or head diameter. It's called the Ramset Super-Power Jobmaster.

Earmuffs Keep Out Noise

THE men above are cooking plastic "doughnuts" which will end up as earmuffs like the ones the worker at right is wearing. They protect hearing on noisy jobs, such as test-firing rifles. David Clark Co., Worcester, Mass., makes them.

Copyrighted material

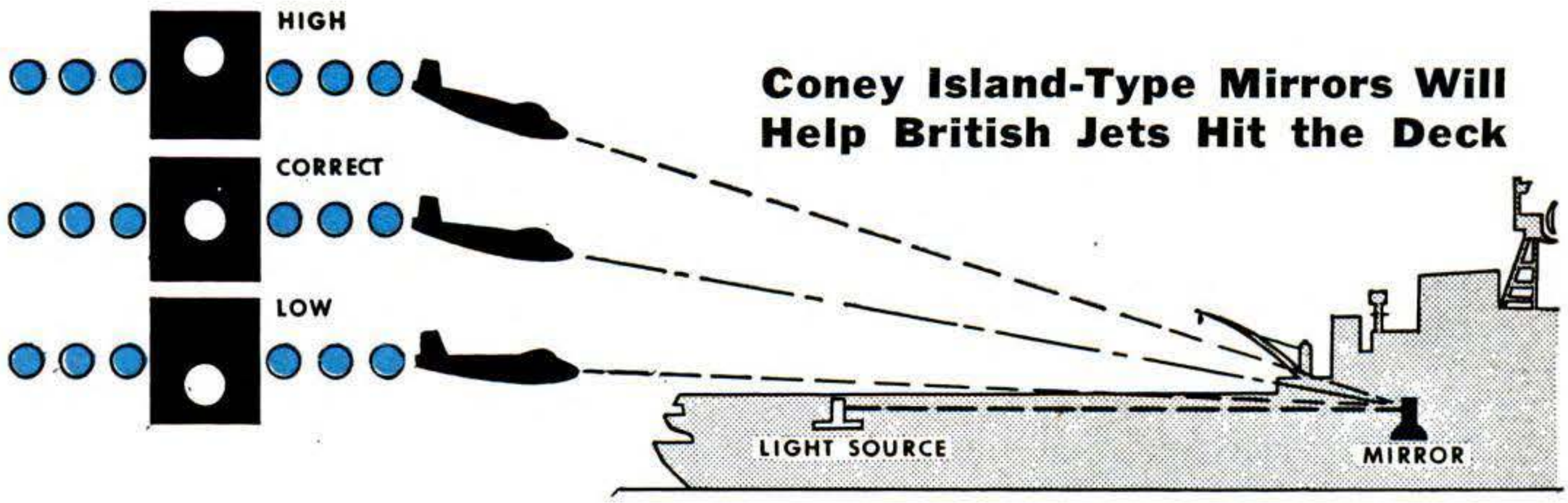
Chill Can't Kill New Heat Lamp

You can pour ice water on a new infrared heat tube without cracking it—even when it is cherry red. But don't try it with your own heat lamp. Secret here is that the tube is made of quartz. General Electric expects the new unit to be used in heating, cooking, drying and baking appliances.

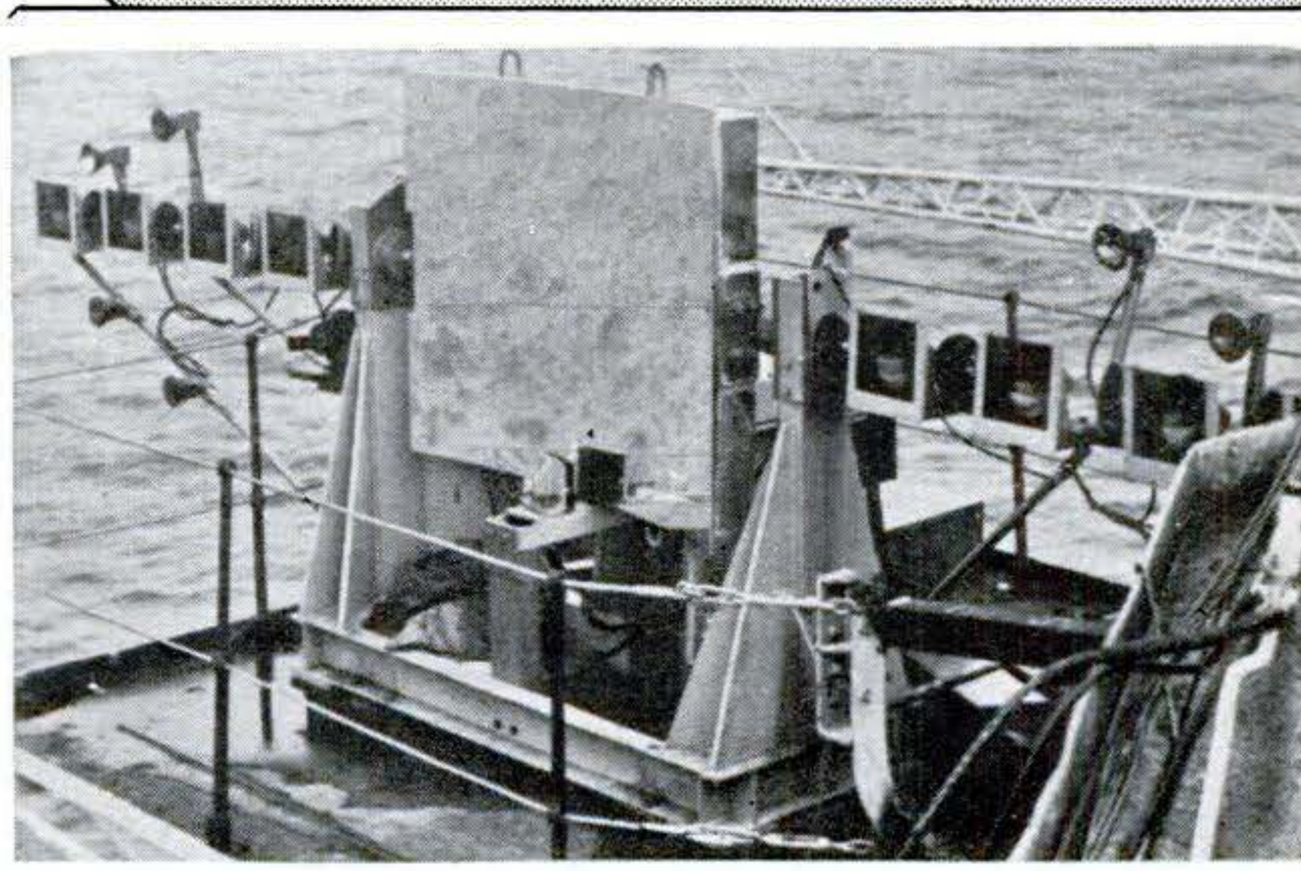
Civil-Defense Radio Fits Pocket

Worn like a hearing aid, this experimental pocket radio is for civil-defense use. It is tuned to the single frequency assigned for emergency broadcasts. The radio has a transistor and germanium diode instead of vacuum tubes, and draws so little power that it runs a month on two dry cells.

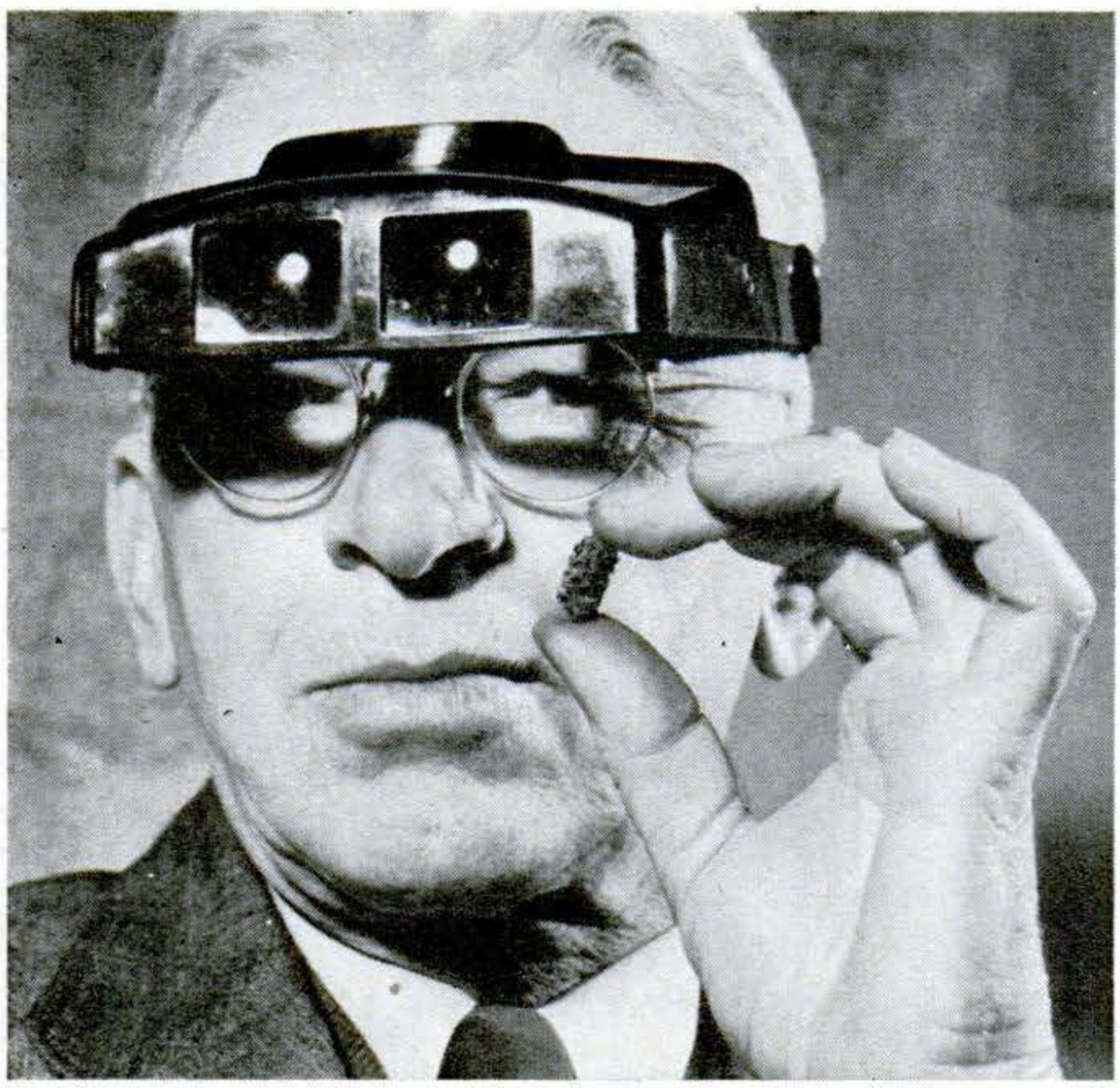
Coney Island-Type Mirrors Will Help British Jets Hit the Deck



The landing-signal officer is being retired from the flattops of Her Majesty's Navy. A jet pilot approaching a carrier from astern will keep his eye on a large curved mirror (right) on which a blob of light is projected. When he is coming in for a landing at the correct angle to the deck, the pilot will see this light blob lined up evenly with a row of lamps on either side of the mirror, as shown in the sketch above.

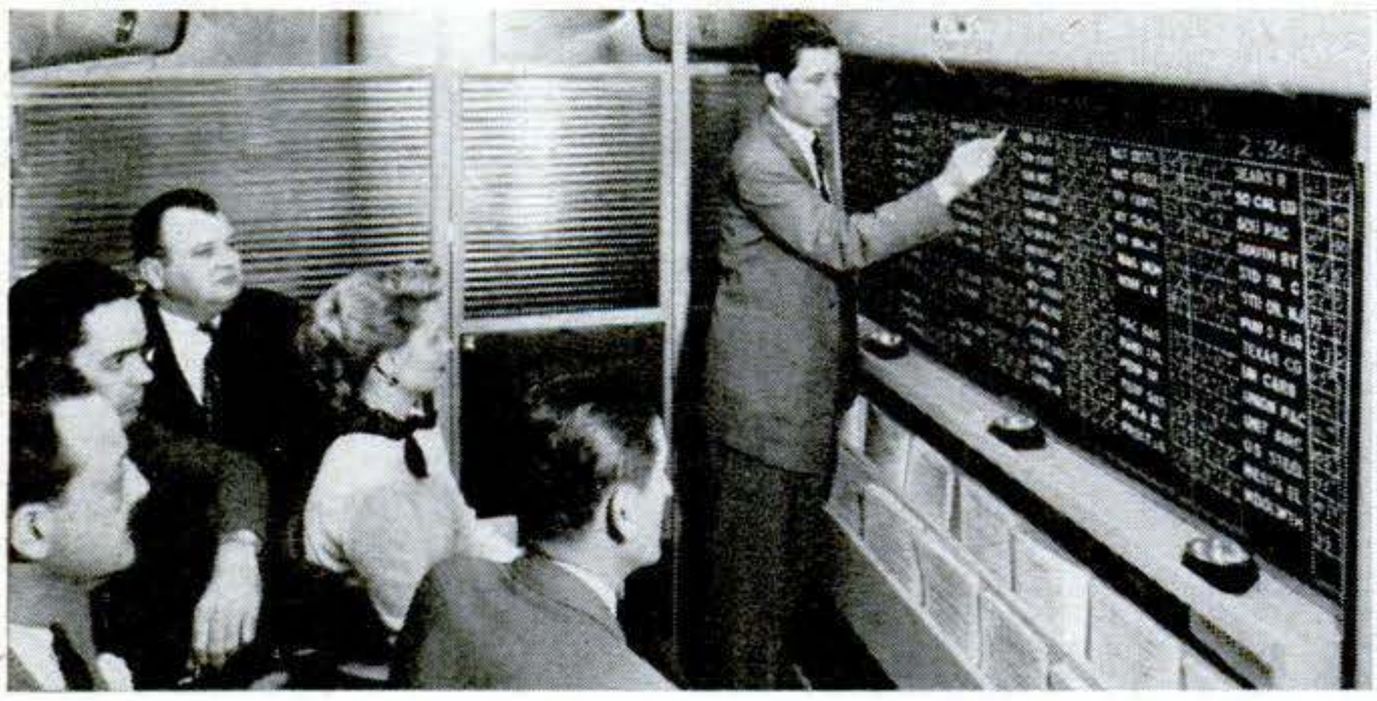


Copyrighted material



Tiny Corn Grew Here 50 Centuries Ago

THAT corn grew on this continent more than 5,000 years ago—probably as a cultivated crop—is indicated by this tiny cob. About the size of a penny, it is displayed here by Harvard botanist Dr. Paul C. Mangelsdorf, who is wearing a combination eyeshade and magnifier. Estimated to be about 5,500 years old, it was dug up in Bat Cave, New Mexico. Corn pollen, at least 60,000 years old, dug up beneath Mexico City last year, is deemed proof that corn originated in this hemisphere, not in Asia as previously believed.



Brokerage Offices on Wheels Take Wall Street to Main Street

LUXURY buses, equipped with complete investment-office facilities, are serving communities around Chicago, Boston and Newark, N.J. Included is a stock-quotation board on which current prices, received by radiotelephone, are chalked up. Merrill Lynch, Pierce, Fenner & Beane, a brokerage firm, operates the mobile salesrooms.

They Say Now .....

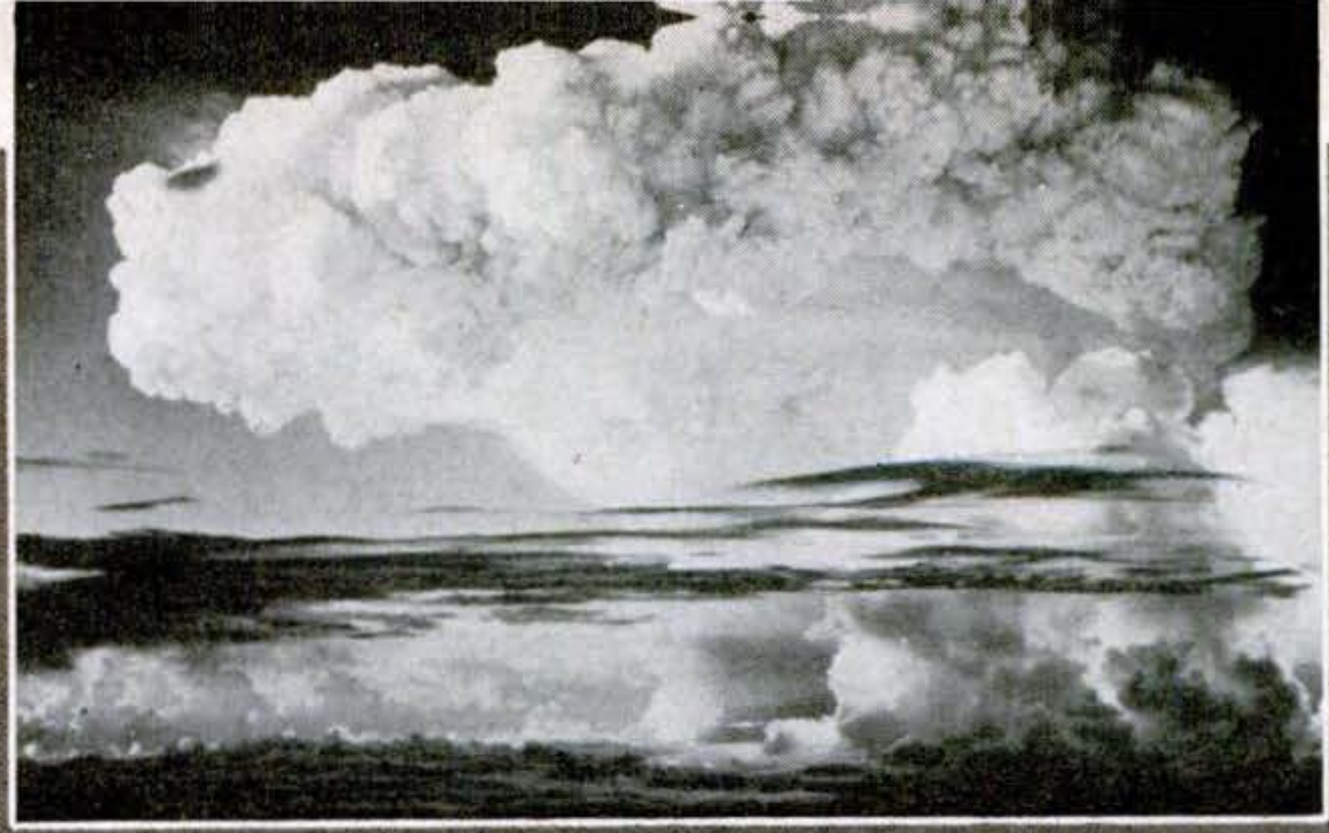
DR. HARLOW SHAPLEY, HARVARD ASTRONOMER: *"There is the fanciful possibility that a planet with life could be independent of a star . . . loose, alone, and wandering in space . . . its heat generated by radioactive minerals. It would have no proper day and night; it would probably be entirely dark except for weak starlight and luminescence from radioactivity . . ."*

W. H. ROBINSON JR., GENERAL ELECTRIC CO.: *". . . The principal difference between the America of today and that of 75 years ago is electricity. . ."*

THOMAS D. JOLLY, VICE-PRESIDENT, ALUMINUM CORPORATION OF AMERICA: *"After man had standardized on the round wheel, he was free to use his brains to make wheels move faster."*

DR. W. R. BAKER, CHAIRMAN, NATIONAL TELEVISION SYSTEM COMMITTEE: *"Color television in its final fruition may take a little longer than the optimists in the industry predicted."*

Copyrighted material



The Good News About the H-Bomb:

Atomic Miracles Are Nearer Now

Reactor center of Brookhaven National Laboratory, busy scene of peaceful atomic research.

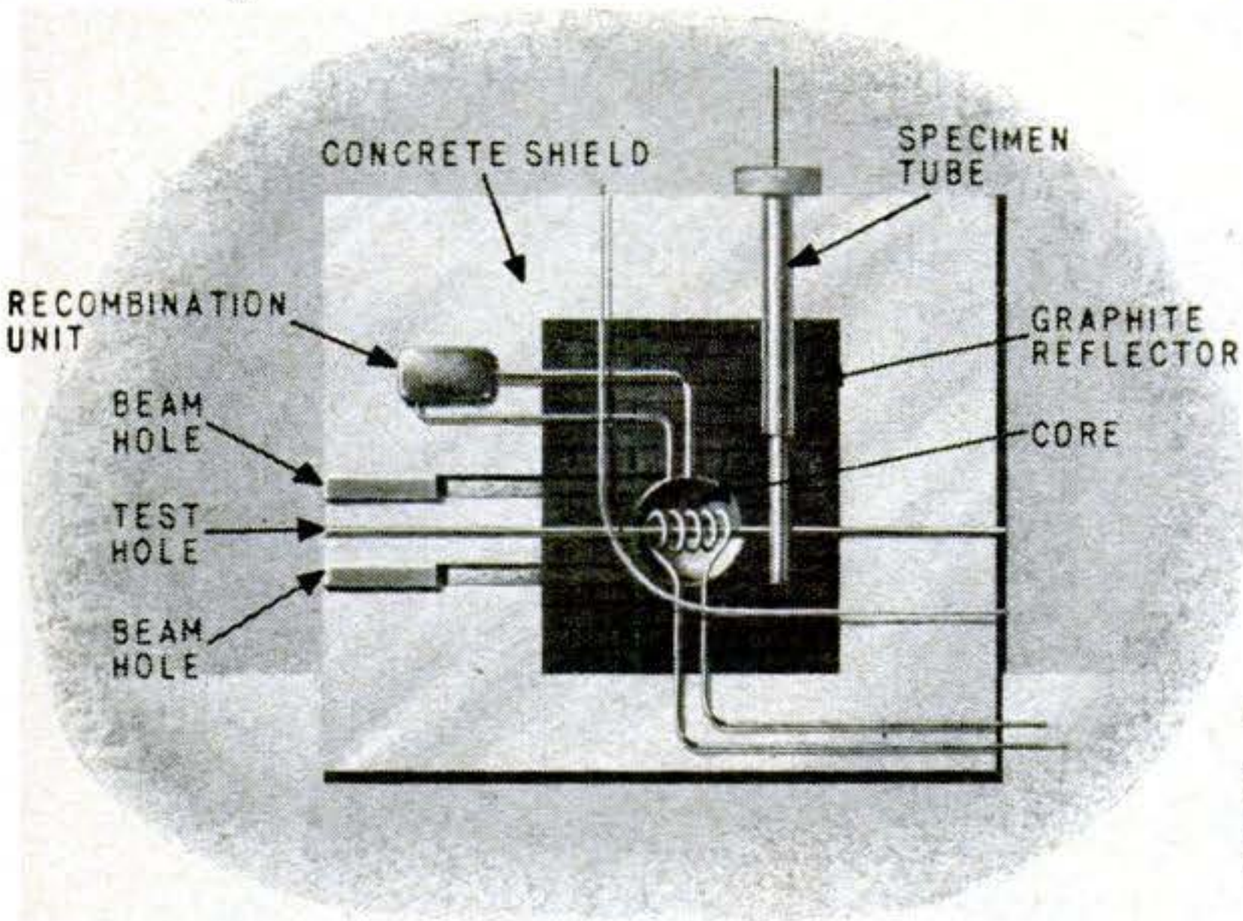
"ONE important result of these hydrogen-bomb developments," Admiral Lewis L. Strauss, Atomic Energy Commission chief, declared when the first photos of an H-bomb explosion were released, "has been the enhancement of our military capability to the point where we should soon be more free to increase our emphasis on the peaceful uses of atomic power."

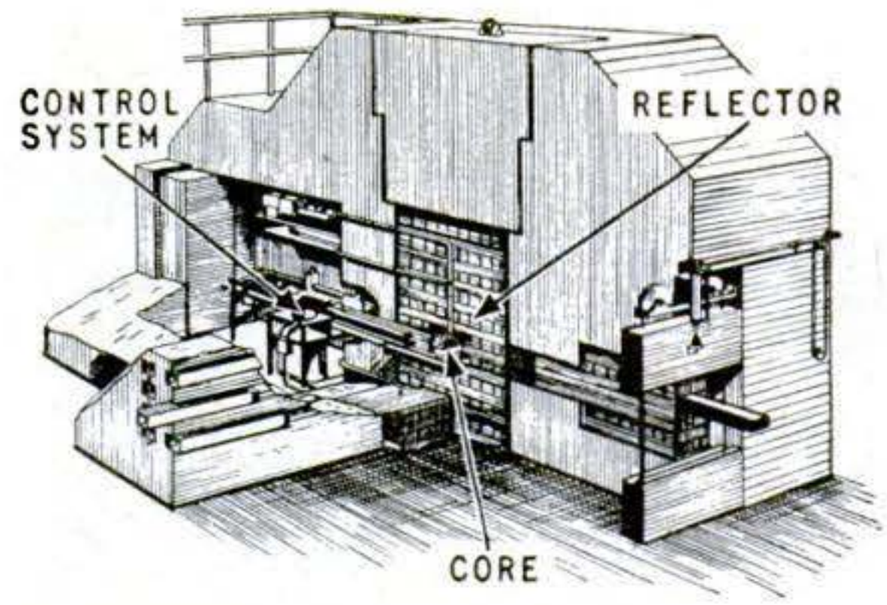
Signs that the day of atomic miracles is approaching at a stepped-up rate have multiplied this spring.

• Plans for developing a feasible atomic-

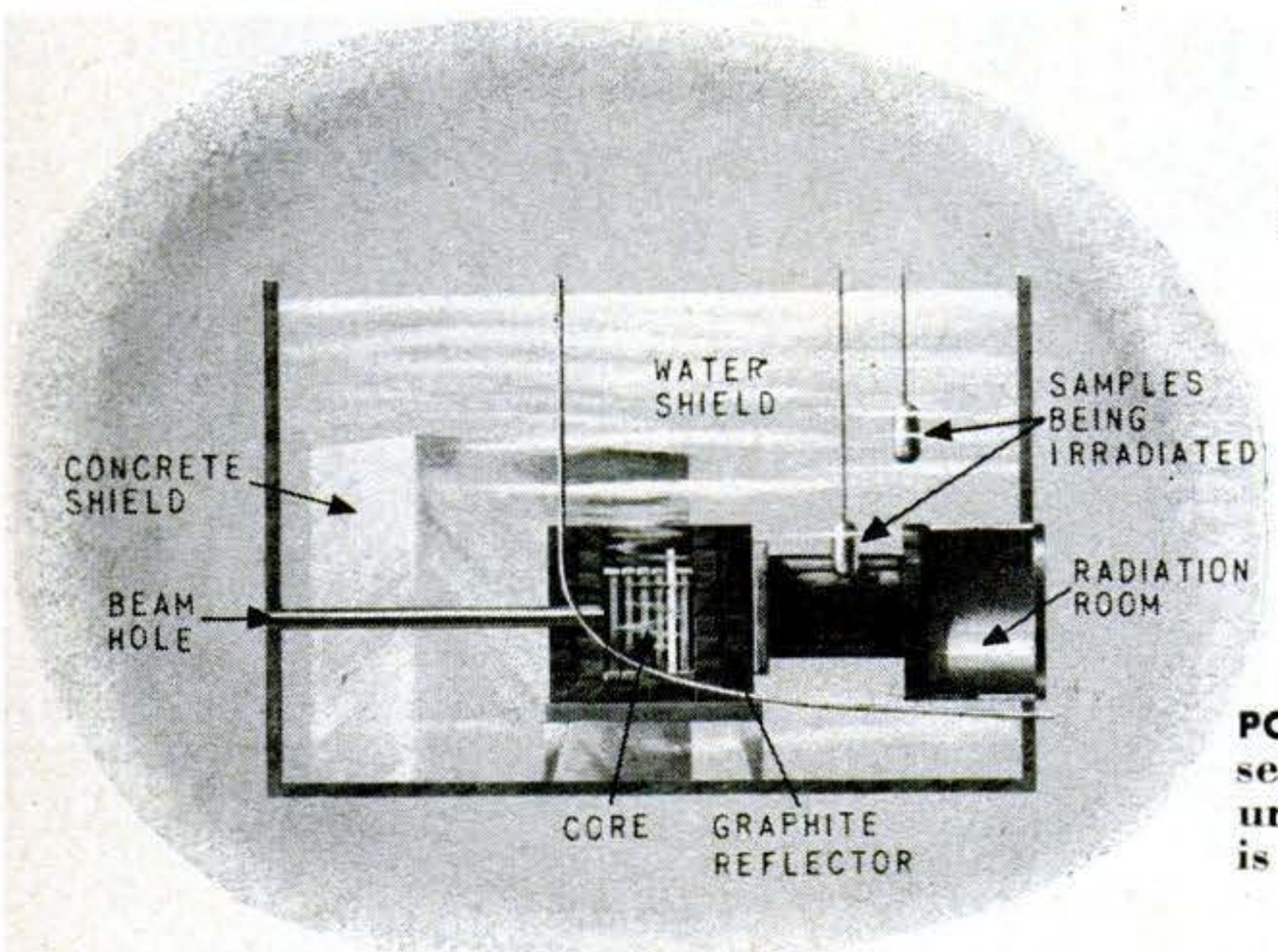
Copyrighted material

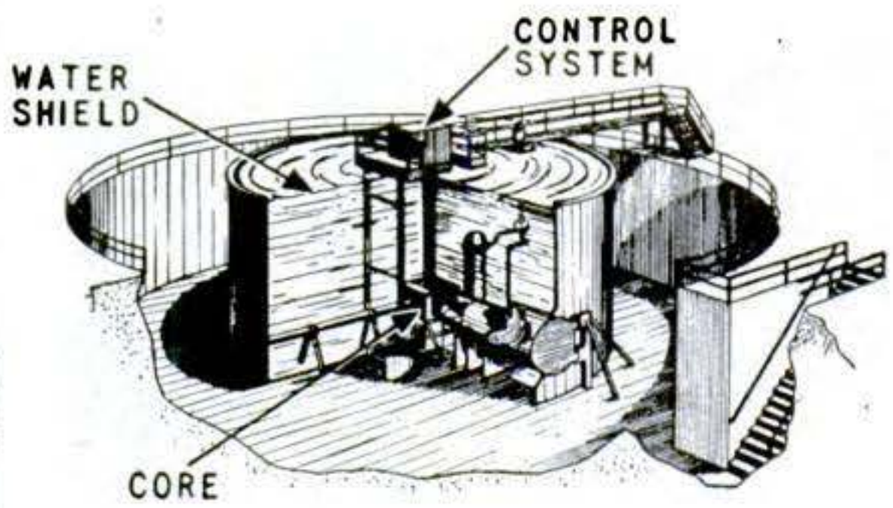
Items from the World's First Atomic-Furnace Catalogue





"TEA-KETTLE," or water-boiler, reactor with a one-foot core of uranium sulfate solution is one of three kinds advertised by North American Aviation.





POOL-TYPE REACTOR, most flexible of research units, using plates of enriched uranium and aluminum alloy for fuel, is also in North American's catalogue.

powered locomotive have been disclosed.

• A contract for the first full-scale atomic power plant in the U.S. has been let to the Duquesne Light Co. of Pittsburgh.

• The AEC has revealed the development of a new type of nuclear reactor, which will convert water directly into steam. This would dispense with expensive heat exchangers in the process of making electricity from atomic fuel.

Dr. L. R. Hafstad, head of reactor development for the AEC, predicts that within five years "we will be building reactors that should be able to compete with power from coal and oil."

With the seed catalogues and fur-storage ads this spring, the postmen delivered a strange, new kind of catalogue —one of atomic furnaces. In this, perhaps the most significant sign of the hastening peaceful atomic revolution, North American Aviation, Inc., presented drawings of three kinds of nuclear reactors that it is prepared to build and fire up for anybody who wants to buy one, subject to AEC approval.

With one of these reactors, you could perform almost any conceivable atomic miracle, save those of making bombs and useful power. You could make certain foods stay fresh for years without refrigeration, create new and better varieties of vegetables, make strange and wonderful new plastics, cause chemicals to combine that nature hadn't intended to link, and make radio-isotopes for the improvement of measuring devices and medical science.

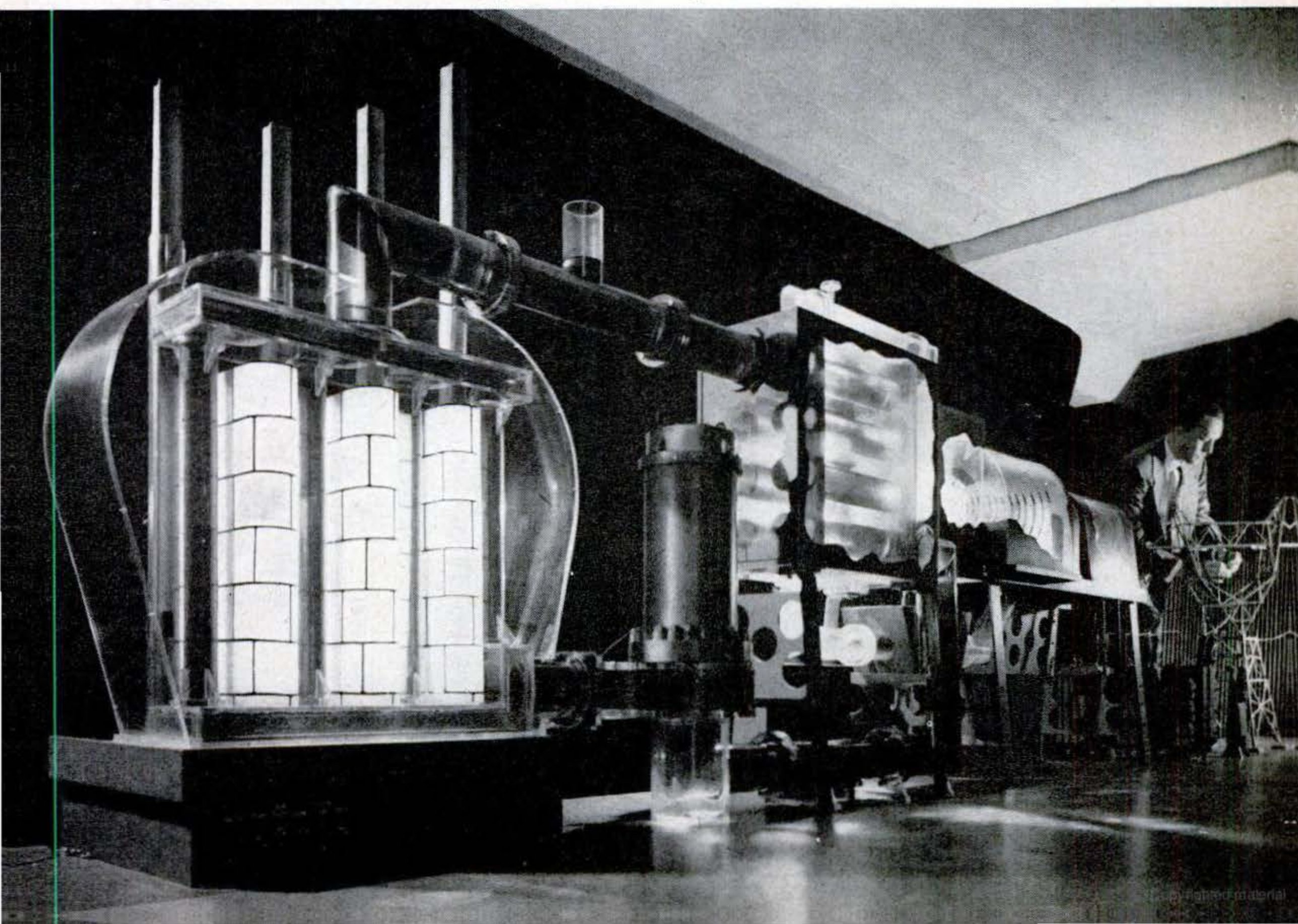
You could make white diamonds turn blue or green, too, if it pleased you. You might even outdo the ancient alchemists by turning baser metals into gold.

Copyrighted material

THIS IS A MODEL of the 7,000-hp. atomic locomotive designed by Dr. Lyle B. Borst of the Univ. of Utah. Others are at work on plans for atomic-powered merchant vessels.

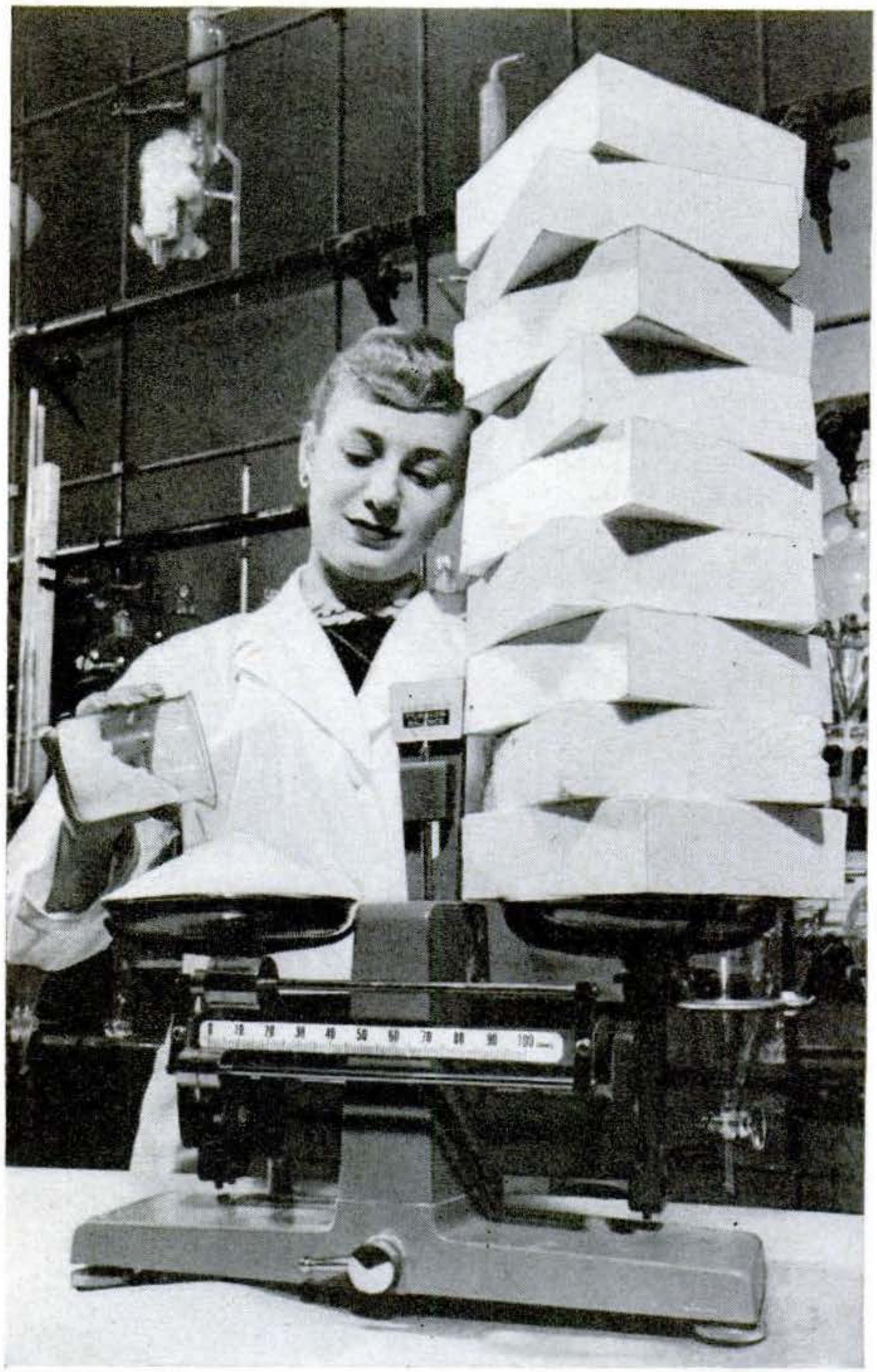
Previews of Atomic Power Units Designed for Peaceful Purposes

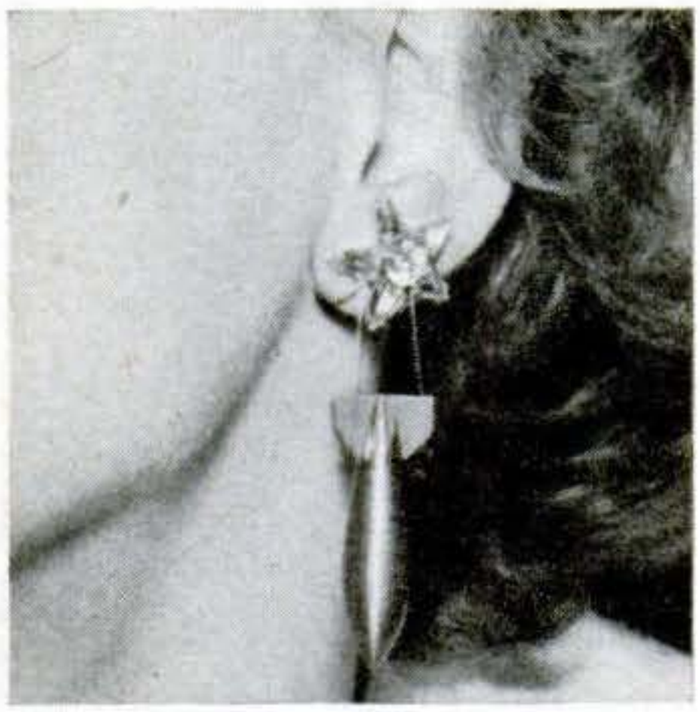
THIS IS A MODEL of the 60,000-kilowatt atomic-power reactor that Westinghouse is to build for commercial use. Uranium rods in pressurized water form reactor's core. END



"Popcorn" Plastic Is Heat Insulator

THOSE big white blocks in the photo at right weigh no more than a little pile of the new polystyrene beads from which they were made. The plastic, said to be a superior insulator, expands greatly under heat, like popcorn, and can be molded into many shapes. Koppers makes it.





Deadly New Missile Doubles as Earring

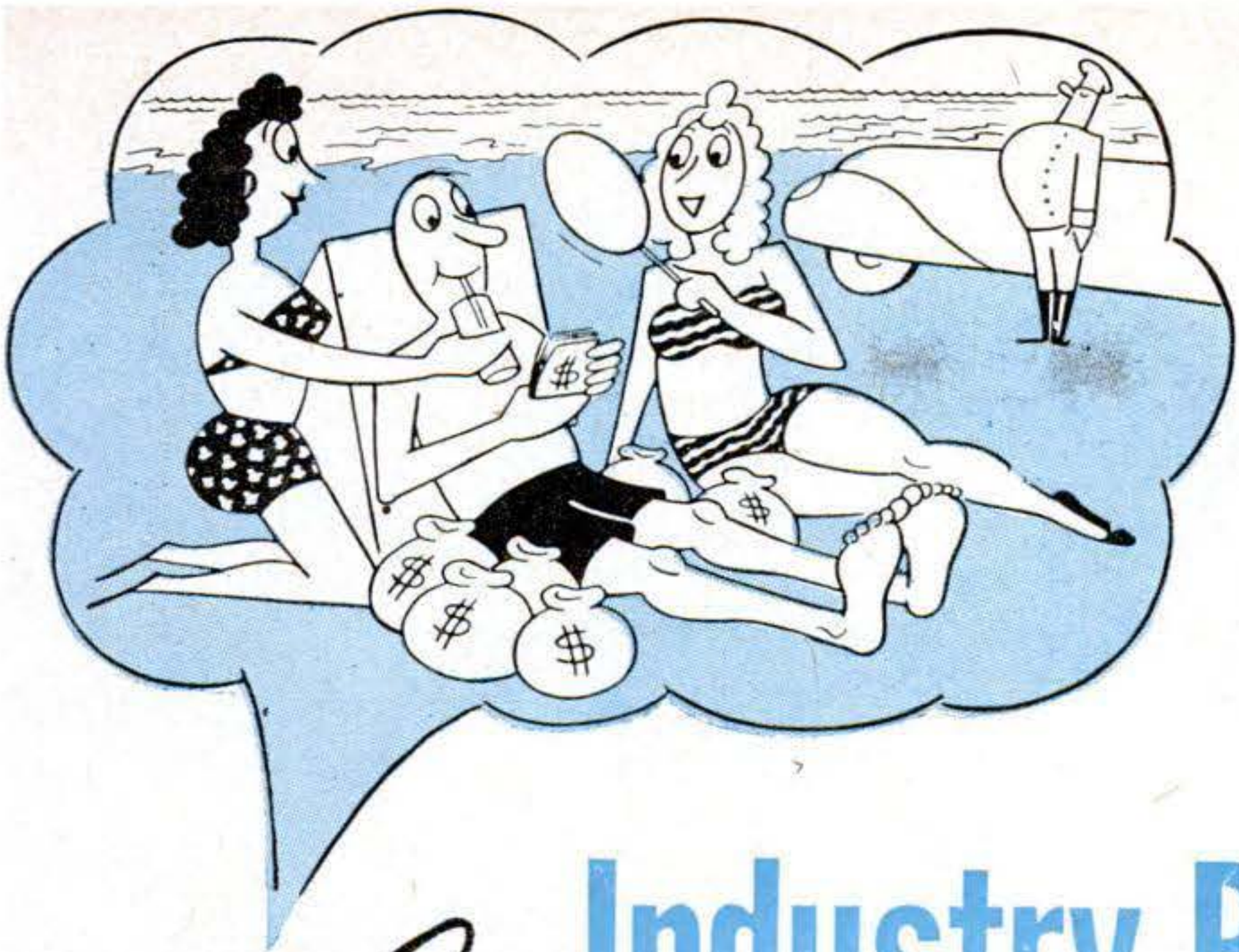
HANGING from the girl's ear above is a Lazy Dog, a tiny new Air Force missile. It has no explosive charge but penetrates like a .45 bullet when dropped from a plane at 5,000 feet.

Their Clothes Tree Bears Peaches, Too

BECAUSE J. G. Harris of Memphis couldn't bear to chop down a favorite peach tree when he enlarged his home recently, he built a new bedroom around it, letting the main branches pierce the roof (right). He and his wife whitewashed the part of the trunk that was enclosed and now hang their clothes on it.

The tree bloomed fully this spring and is expected to bear a load of fruit as well as part of the family wardrobe.

Copyrighted material



Millions of dollars go out every year to the men and women who can show their bosses how to save money.

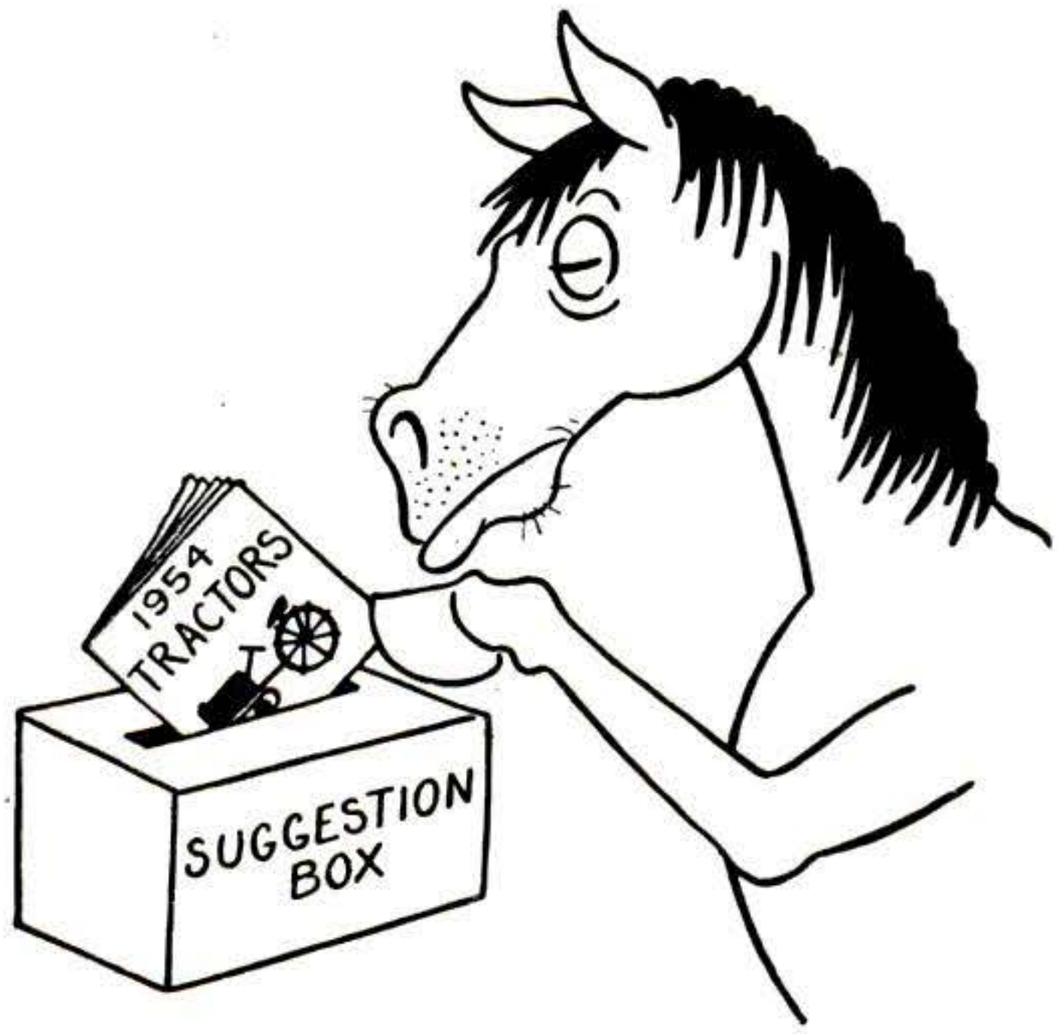
Industry Bids High for Bright Ideas

By Ernst Behrendt

THE old suggestion box on the office wall, butt of many a hoary joke, has today become a fantastically successful adjunct in the operation of business, industry and government. All over the country, employers are asking their workers: "Can you think of a way to get the job done better, cheaper, faster?" Thousands of ideas accepted by agencies of the federal government have saved the taxpayer $170,000,000 in seven years. Savings for industry have been estimated at several billion dollars.

These ideas range from the disarmingly simple to the overwhelmingly complex. Bill Moloney received $10 for suggesting that wheels be put under mailbags so that interoffice messengers would not have to carry heavy loads. Tim McCarthy of New York had a way to keep records from smearing: Put blotters between them. Con Edison paid $20. For a highly technical suggestion on how to manufacture better graphite bearings,

Copyrighted material



Charles Zamiska, a Cleveland foundry worker, was awarded $28,000. He quit his job and bought himself a farm.

Companies are going to a lot of trouble to make you rack your brains for prize money. Many of them have set up elaborate suggestion systems that even include "merit" awards—for "ideas that show evidence of constructive thought but which are impractical for adoption." Some firms, like American Cyanamid, send their staff members provocative memos: "Our records show we have not yet received a suggestion from you. Won't you use the enclosed blank to give us the benefit of your ideas?"

The federal and state governments are just as eager. In Government offices, paychecks are issued together with a message which says, in effect: "Produce an idea, please." The Government has realized, along with private industry, that nobody really knows as much about a job as the man who is actually doing it. He is likely to be aware of things that escape the specialist.

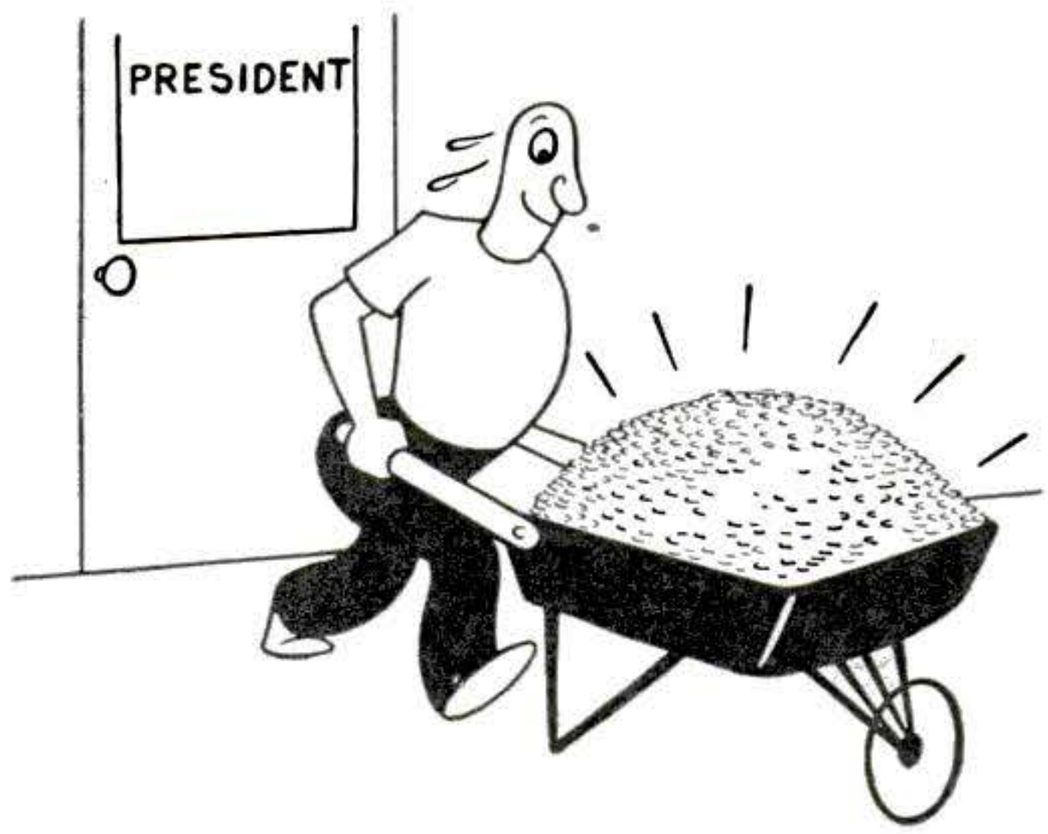
A classic case is that of the woman employee of Remington Rand who noticed one day that a certain office machine had a hole for which she could see no earthly use. It was an intricate machine, whose workings she was supposedly not qualified to grasp. But she went ahead anyway and suggested that the hole be investigated. Some time later, red-faced company engineers admitted that the woman was right. The hole was useless, a leftover from a previous model in which it had been useful. As a result of all this, Remington Rand began saving the cost of a drilling operation, and the employee got an award.

In a similar manner, Army employee J. W. Hill Jr. of Memphis noticed that although no one ever hung up a broom, every broom handle had a hole in it. Hill's sharp eyes are saving the Army $15,233 a year on holes. He got $275.

Labels Saved $7,328

These examples make it obvious that ideas need not be complicated in order to be good. A clerk in Chicago's Drake Hotel suggested that pieces of glassware and china be labeled with their cost and displayed for all employees to see. The idea was to make employees cost-conscious and therefore more careful. It worked. The next year they broke $7,328 less glass and china. Savings to the Drake: $7,328.

To an employer, even tiny improvements may be worth thousands of dollars. Fred Krause, employed by the Whirlpool Corporation in St. Joseph, Wis., figured out a way to save five cents



on each automatic washer; for him the nickels added up to an award of almost $4,000. Stanley P. Wozniak, an automobile worker, managed to slice a few inches off each hose connection; the Buick Motor Company paid him $2,500 for the short cut. At Ford, Pete Saputo discovered that he had an odd job indeed: removing a creak that wasn't there.

Copyrighted material

Engineers had decreed that unless a jute pad was glued to the back of the seat, the seat would touch the spring and a creak would result. But they were wrong, Saputo found—jute or no, there was no creak. Saputo suggested that he be given a more useful job to do. He was, and $1,500, too.

Today, close to 10,000 suggestion systems are in operation. Many of them have been organized by the National Association of Suggestion Systems (NASS), which was started in Chicago in 1942. Today's list of members reads like Who's Who in Business and Government. It includes members in Great Britain, South Africa and Canada. Every employer, NASS claims, has "acres of diamonds in his own back yard." If he invites his employees to suggest improvements, improvements will materialize.

NASS stresses the "recognition" that workers get when they contribute ideas to the progress of their company. A suggestion system, by shortening the distance between the individual worker and

top management, can be an important tool in labor-management relations. Recognition of a man's importance will never hurt his morale.

A worker who has had an idea accepted and paid for is likely to show that one idea breeds another. Repeaters include people like Nick Sellers, who works for Goodyear. Out of many dozens of his ideas, 51 got adopted, netting him $1,600. Norman Kimball, repairman for Whirlpool, turned in 95 suggestions in 95 weeks and realized more than $3,000.

Awards are usually based on anticipated savings—some companies pay 10 percent, others up to 50 percent, for the first year, and sometimes there is the matter of future royalties. Most Government agencies have an award ceiling of $100 although there are exceptions. The limit at Ford is $3,000; at General Electric, $25,000. Some companies have no limit; they pay a certain percentage of their savings, and the more the better.

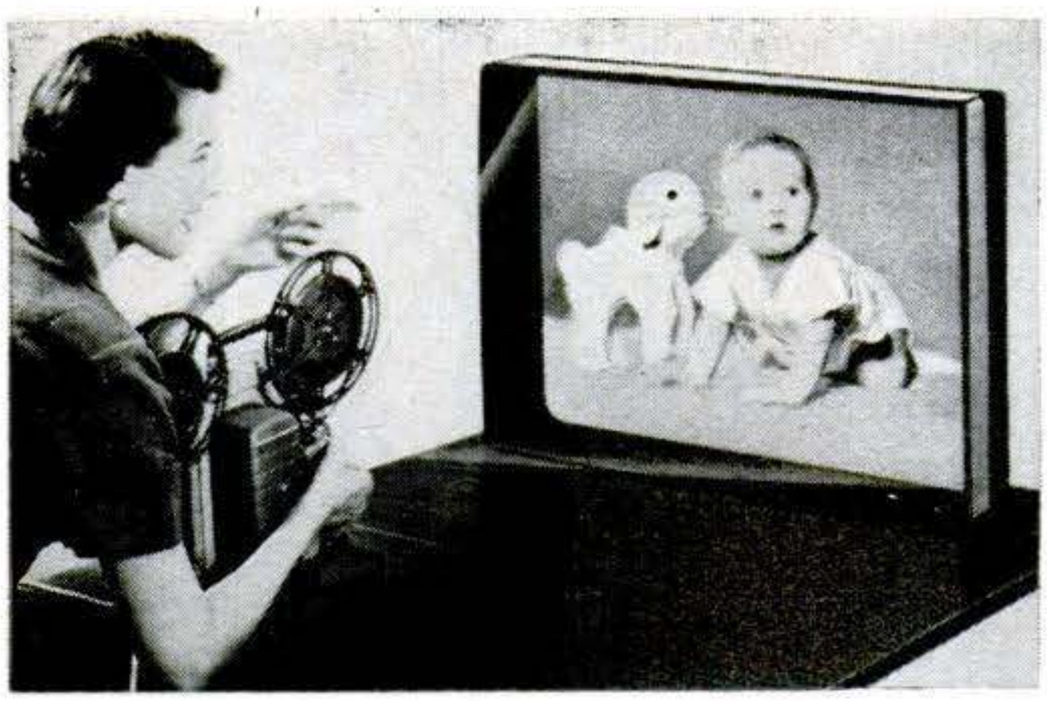
At General Motors, 80,309 employees submitted 181,552 suggestions last year alone, and for the 46,503 suggestions that were adopted the company paid $2,419,708.68. Millions of federal employees belong to Government suggestion or incentive award systems. In 1950, employee suggestions made possible annual savings of more than $20,000,000 in the Department of Defense alone.

One Man's Contribution: $250 Million

The prize for the largest savings ever produced should probably go to a Government employee named Raymond L. Graumann. While he was a civilian engineer at the Washington Navy Yard it occurred to him that the 40-mm. shells were not as good as they could be. He decided to improve them. When his work was finished he had doubled their effectiveness. In the single year 1942 he saved the United States $23,000,000, and by V-J Day he had saved the country almost a quarter of a billion dollars. His reward was modest: about $5,500.

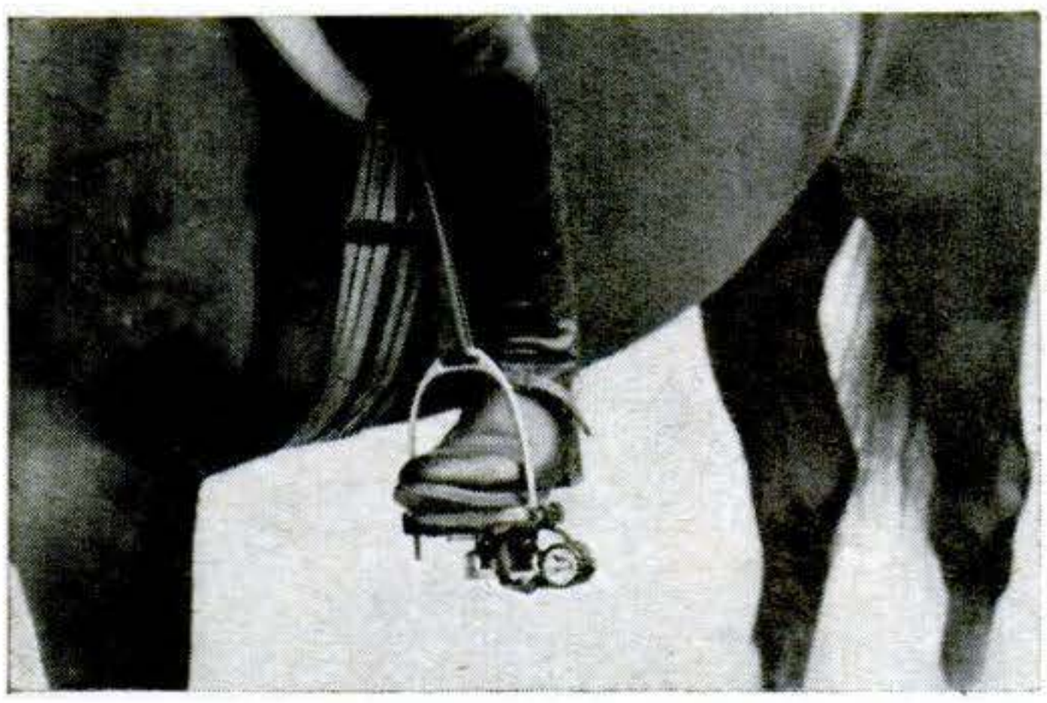
Suggestion systems are not a new idea in the United States. Back in 1880 Yale and Towne offered its employees one dollar per idea, and dutifully paid $10,000 for the suggestions submitted. Since then the system has become an integral part of our business and industrial life, and an invaluable means of steering American ingenuity into productive channels. It is the rare employer today who will not take time to listen to what the worker has to say about his job. As Eddie Rickenbacker, President of Eastern Air Lines, puts it: "No idea is too small to be considered; no idea is too large to be analyzed." END

Copyrighted material



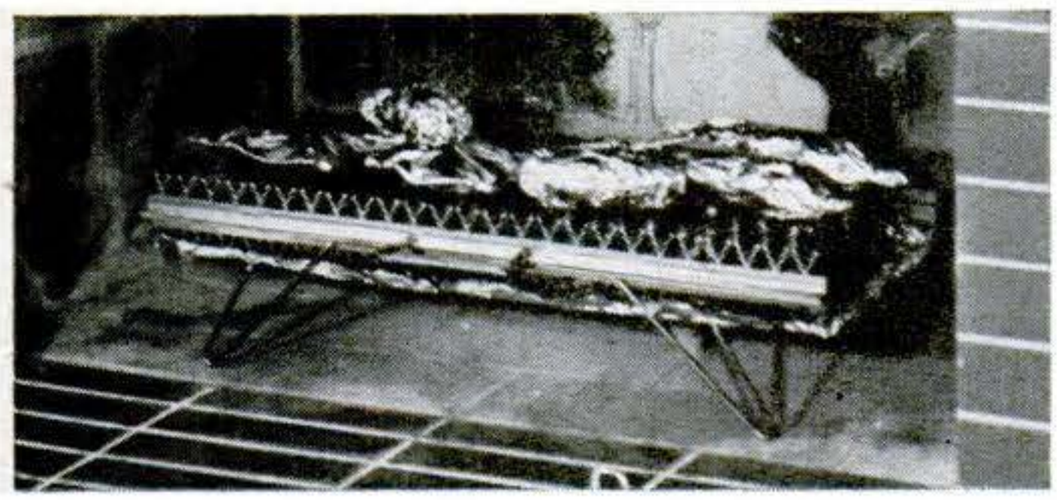
Screen Built Into Movie Kit

LIFT the lid of a new 8-mm. movie kit and you find the built-in preview screen above. Inside the case are a camera and projector, a camera case, a light bar with two lamps, a cartoon film and a 50-foot roll of color film. Bell & Howell makes the kit.



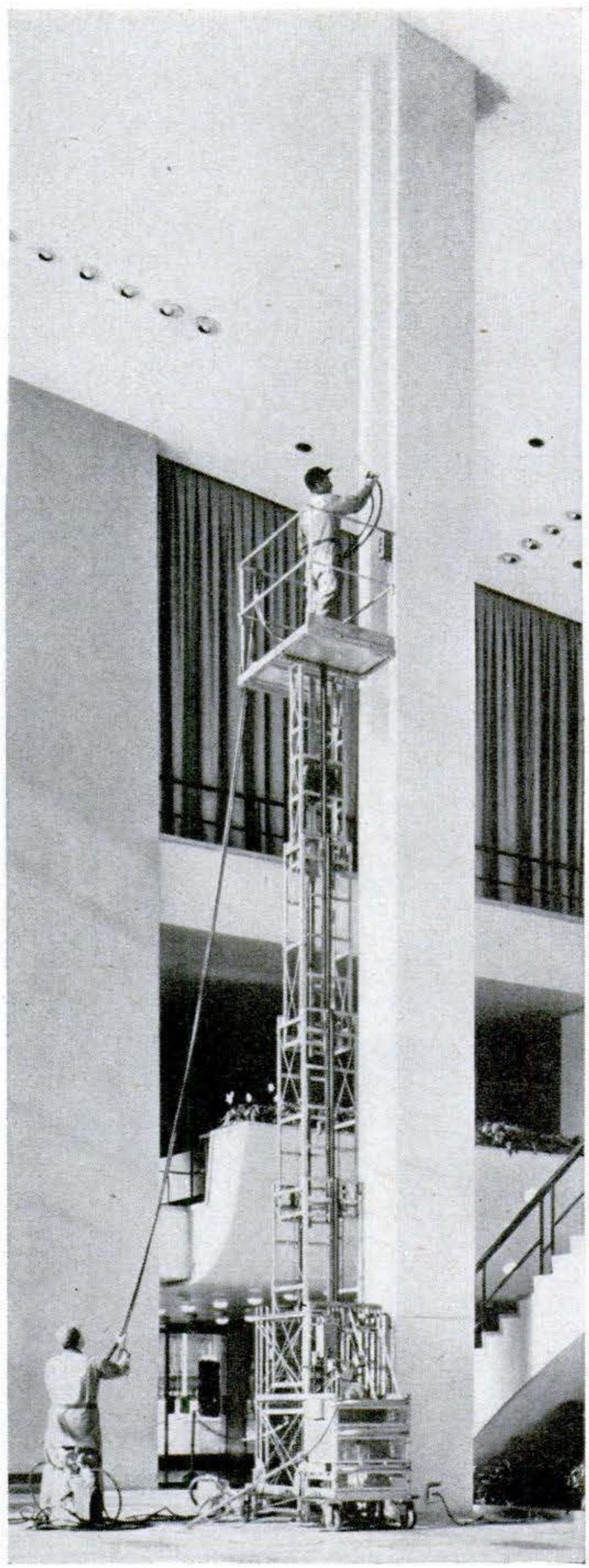
Cops' Horses Get Tail Lights

LIGHTED stirrups make night-riding mounted police of Stuttgart, Germany, visible to oncoming cars. Modified flashlights fixed to the stirrups cast a white beam to the front, a red one to the rear.



Picnic Grill Cooks Indoors

THIS portable grill cooks outdoors, or indoors in your fireplace, reflecting heat upward from aluminum foil under it. Packed in the carrying case are charcoal briquettes, starter fuel, foil and a pair of tongs. The Reynolds Metal Co., Louisville, makes it.



UN Columns Are Dirtproofed

VISITORS streamed in and out while this UN building was decorated. Unhampered by masks or dropcloths, workmen sprayed with an easy-to-clean plastic that dried before fingers could mar it. Progressive Industries, Long Island City, N.Y., did the job.

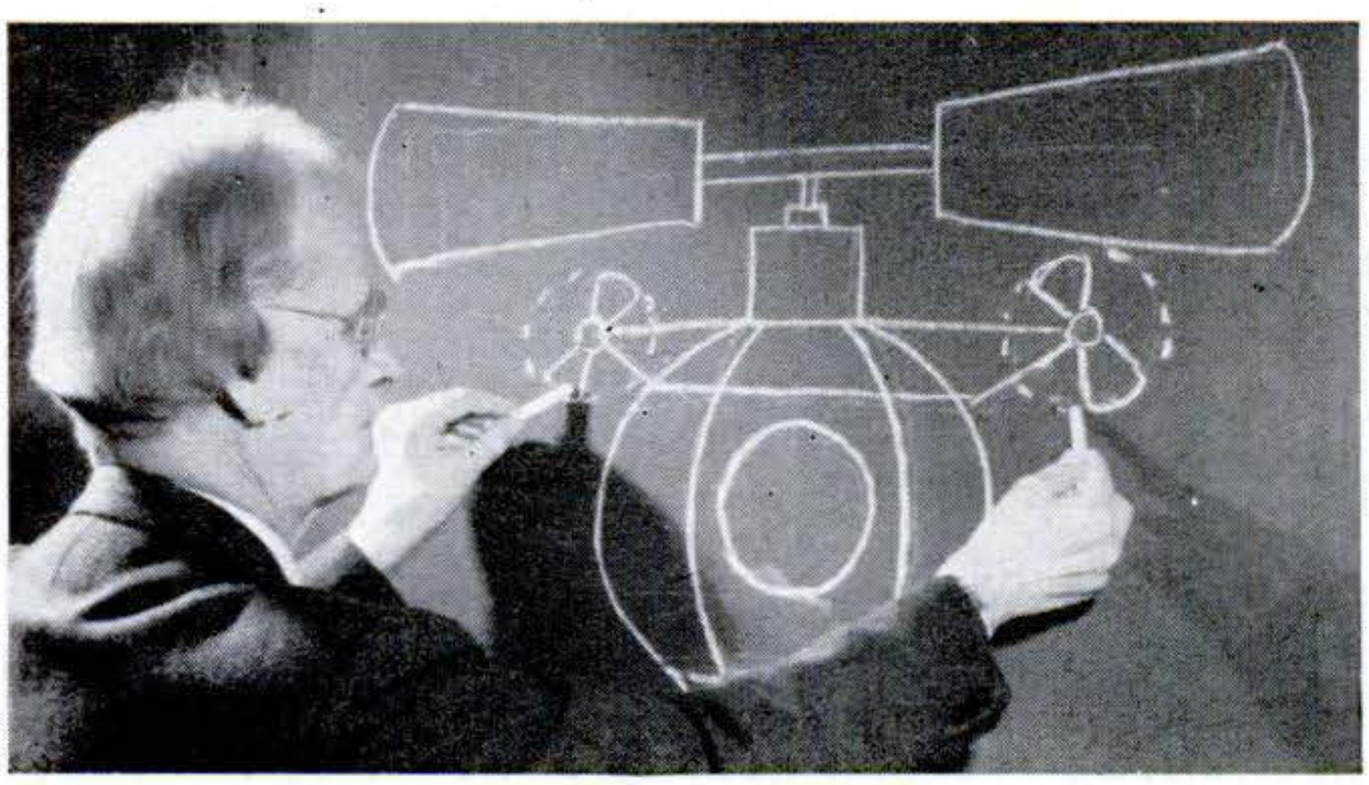
Copyrighted material

Tall Tripod Catches the Queen

THE news cameraman above is preparing to shoot over the heads of a crowd. The 12-foot tripod put the camera lens high above the press of loyal subjects greeting Queen Elizabeth and the Duke of Edinburgh on their recent trip to Australia.

Ladder Helps Rapid Reader

GEORGE MURCH, a Denver University student stands on a ladder to do some fast reading while the copy unrolls and drops to the floor. In speed tests, Murch read an amazing 8,000 words a minute, then took a test on the subject and scored 100.



Newest Diving Ball Is Underwater Copter

PROFESSOR Auguste Piccard uses both hands to sketch his latest invention—an underwater helicopter. He hopes to go down 6,000 feet into the sea with it. The two small props, powered by electric motors from within the machine, will propel the Mesoscaphe forward and backward.

Copyrighted material

Gus opened the hood and listened. The motor purred like a smooth-running sewing machine.

Copyrighted material

Gus Lends Luck a Hand

The tired old car and the tired old couple in it—somehow the Model Garageman had to put new life into both of them.

By Martin Bunn

GUS WILSON was under a car in the Model Garage, installing new bearings, when he saw Stan Hicks go out into the warm spring sunshine to wait on a customer at the pumps. Stan filled the gas tank and then cautiously removed the radiator cap, leaping back from a gush of steam that arose.

What an outfit, Gus thought—an old sedan, loaded to the windows with luggage that sagged the springs. It was a heavy load, but still the car wouldn't boil if it was in any sort of shape. Maybe he'd better go out and take a look.

About to Give Up

There was an old, gray-haired couple in the car. Gus leaned on the window ledge beside the driver and gave them a slow, welcoming smile.

"Nice day," he said. "Going far?"

"Going far!" the old man retorted. "We was. Clean to Colorado. Now we're turning back. Don't mind particularly myself, but hate to, because of Ma."

Gus looked at the thin, weary-faced woman beside the man, and his expression became concerned.

"That's too bad," he said. "How come you're turning back?"

"Well, it's this way," the old fellow said. "Name's Hodge—Sam Hodge. This is my wife, Mary. Me and Ma been running a farm downstate a way for forty years. It wasn't much of a place, but we ate regular. Then Ma here got sick, and Dr. Shumway reckoned we'd best go west so Ma could get well. We didn't have no money to start over in a new country, so we just set and figgered a while. Something will turn up, Ma tells me, and sure enough it does."

"You don't say," Gus said.

"That's right," the woman cut in. "I told Pa it would and it did. And I've been telling him that we don't have to turn back now. If our good luck got us started, and helped us to meet Mr. Clark and be offered that caretaking job, right where Dr. Shumway said we should go, it'll help us get there."

"Women," the old man said, getting out of the car and stretching his small, wiry frame, "are uncommon inclined to argue. We put the farm up for sale, had the car all fixed up, loaded our rigging and started out. Car's been a-b'ilin' ever since we started, and that's only a few hours back. What'll happen when we get into the mountains? Cost us over a hundred dollars to have the car fixed. We ain't got the money for no more of that kind of fixin', so I says we'd better turn back before we get stranded too fur to turn back."

Overhaul Didn't Work Out

"You had the car all fixed up," Gus said. "Then why should it boil? Radiator must be clogged."

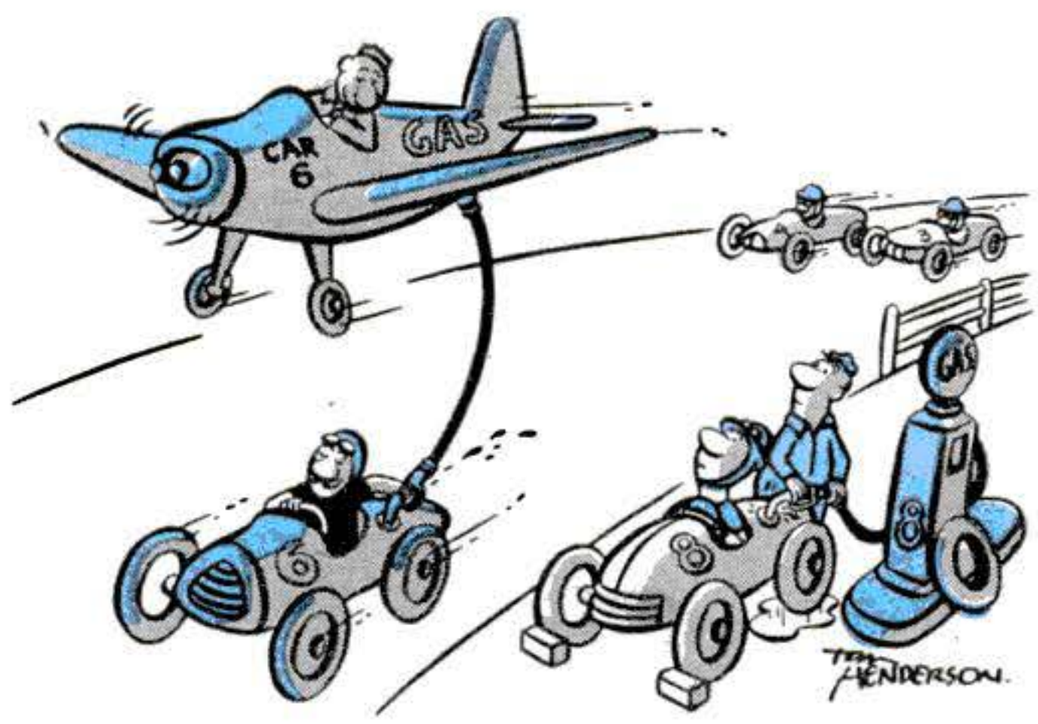
"Thought of that," the old man said wearily. "If it was only that we'd go on. Had it flushed and a new water pump put in, a piece back. 'Tain't that. Feller

Copyrighted material

that did my work back home just didn't do a job. Charged us for fixin' up the shaft, reboring the cylinders, putting in new rings and bearings, grinding the valves, and such. He charged, but guess he didn't do the work."

"That's a shame," Gus told him.

While Stan Hicks was collecting for the gas, Gus walked around to the rear of the car, stooped to peer into the exhaust pipe. The inside surfaces had that whitish, clean look that means good compression and clean firing. The motor started then, and as Gus moved up beside the driver he saw the old man twist the wheel as he shifted into gear, in preparation to turn around and head back the way he had come. The woman raised a protesting hand, then dropped it into her lap in resignation.



"Hold it, Mr. Hodge," Gus said quickly. "Mind if I listen to this motor a minute?"

"Go ahead and listen," the driver said. "Listenin' sure can't do no harm."

Gus opened the hood and listened. The motor purred like a smooth-running sewing machine. He leaned in through the open window and his eyes moved over the instrument panel. The speedometer showed 82,000 miles. He opened the door, reached in to depress the throttle, revving up the motor.

Gus Spots the Trouble

"Watch out," the old man said drily. "Some of the boxin'll fly out of her."

Gus's eyes halted on the oil-pressure gauge. The car, newly overhauled, with a reground shaft and new bearings should have held at 40 pounds of oil pressure at the speed the motor was turning over. It held at less than 10. Gus eased up on the throttle, and when the motor died to idle the pressure dropped until the oil-gauge needle was almost resting on the pin.

"This motor," he said flatly, "is in good shape, except that it doesn't have any oil pressure. Any motor will boil under load without oil pressure. Probably needs a new oil pump, or the screen's clogged. It's a quick job. I'll put in a rebuilt pump and check the screen for 10 dollars."

"Fellers all along the road been tellin' me things like that," Hodge said wearily. "A couple more quick jobs and we won't have the gas money to get home. I ain't strandin' Ma way off some place."

"You're the doctor," Gus said, shrugging his shoulders and turning away. He moved toward the garage, but he found that he couldn't so easily shake the look that he had seen in the woman's eyes. The car turned from the pumps, halted at the curb to wait for passing traffic. Gus moved back.

"I'll gamble on it, mister," he said to the old man. "I'll fix it or it won't cost you a penny."

A stubborn set came to Hodge's jaw. He shifted into gear, as if to move forward. Then, suddenly, his resistance crumbled.

"All right," he said, "I'll take you up on that. Your offer seems to be fair enough."

Gus put the car on the hoist, took off the oil pan with a spin wrench. It occurred to him that he was a fool. A clean exhaust pipe only indicated good valves and rings, clean firing. He hadn't heard knocking rods, but the mechanic who had overhauled the car could have put in new rod bearings and neglected the mains. Or he could have put in new mains on an out-of-round main shaft. Oil would spurt here as if from a leaky kettle.

The oil-pump screen looked clear enough, but Gus wasn't taking any chances. He cleaned the screen and installed a rebuilt oil pump, poured the

[*Continued on page 246*]

Copyrighted material

America's fastest-growing sport

Few sports have increased in popularity with the speed of underwater swimming. To join the crowd on the bottom of the sea, you can spend a fortune on equipment (some of it is pictured on pages 174-175). Or you can get in the swim with homemade gear. Herb Pfister has built his own shallow-diving mask outfit, pump, snorkel, fins and look box. You'll find his directions on the next 10 pages.

PSM PHOTOS BY W. W. MORRIS

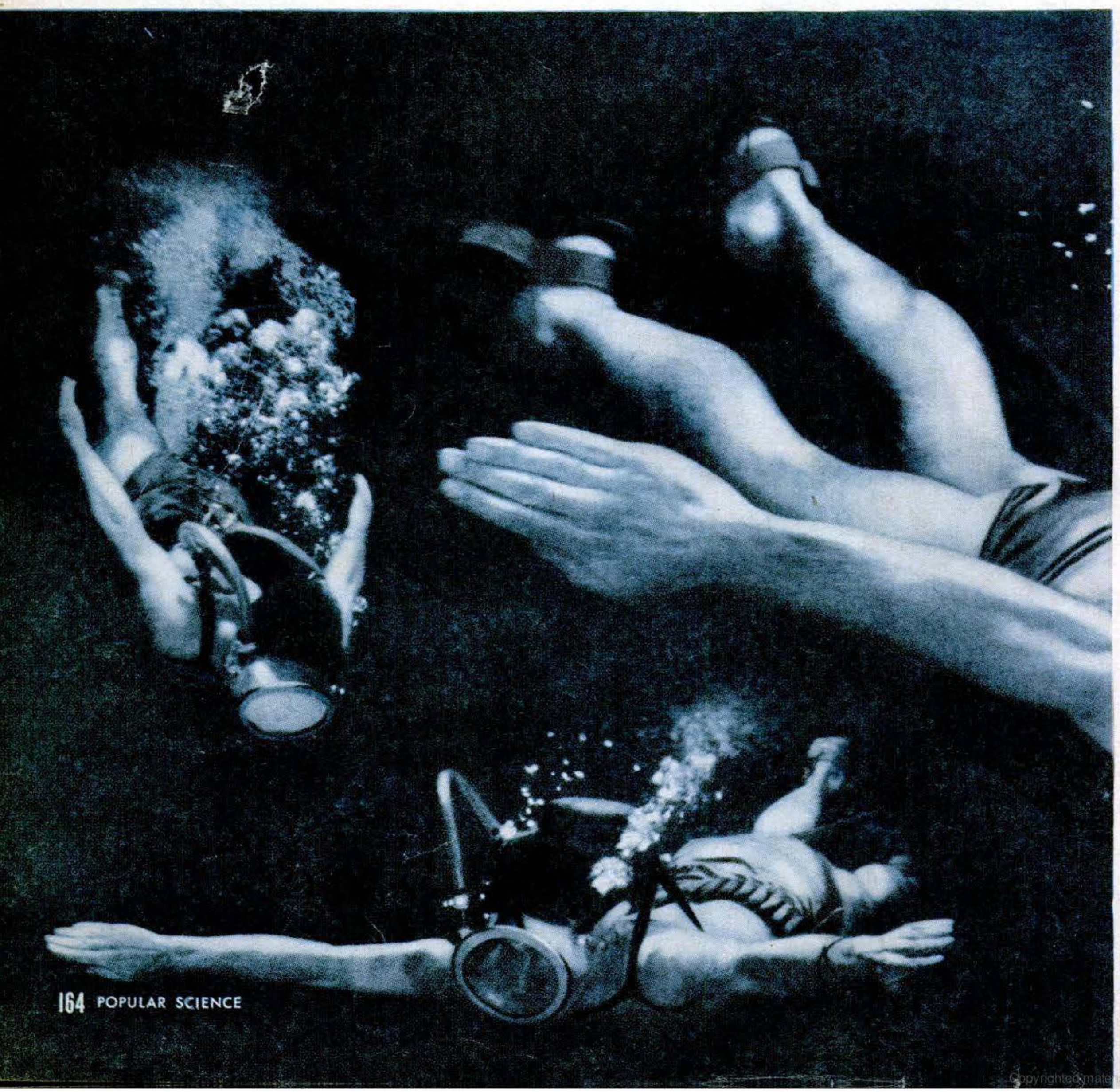
How to Explore Underwater Playgrounds

A $15 Diving Outfit That You Can Build

Most of the fun and beauty under water is at 15 or 20 feet. With this outfit you can breathe there as long as you like.

By Herb Pfister

MOST people swim the hard way—splashing along on the surface, gulping air and struggling to keep their heads out of the water. Under the water with a diving outfit, or even a snorkel, you can relax. Your vision is clear when you peer through the glass plate of a face mask and you can enjoy all the interesting sights that surface swimmers never see. Add swim fins for moving effortlessly through the water



Copyrighted material

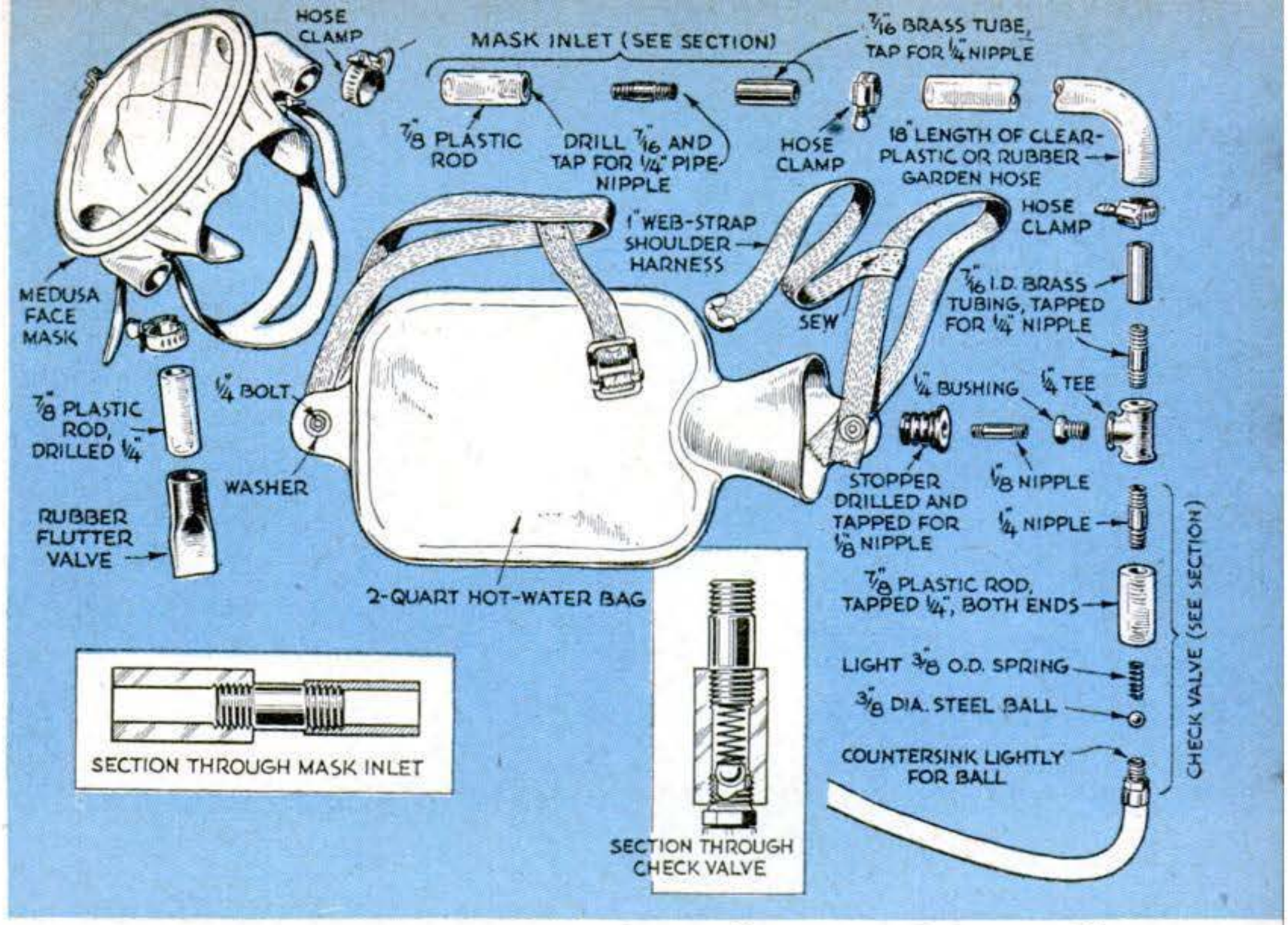
and you're set for the fast-growing sport of skin diving.

Despite its ridiculously low cost, the homemade mask diving outfit pictured below is as comfortable and as practical for shallow-water diving as the best of them. Breathing is easy and unrestricted (I even managed an underwater yawn), because the hot-water bag stores pure air while you exhale—air that would otherwise be wasted.

Safety is built in. It takes about 10 pounds of air pressure to keep your lungs expanded in 20 feet of water. Without it, the weight of the water around you would force your chest in, literally squeezing the air out of your lungs. A ball-check valve in the air line of this outfit keeps the air under pressure in your lungs, even if the air hose should break or be accidentally yanked off the pump fitting. In addition, the breathing bag will still retain one more lungful of air—enough to get you to the surface from 20 feet.

Copyrighted material

MEDUSA FACE MASK is most easily adapted to air hose. It can also be used for short dives while you hold your breath. The snorkels close under water.



HOT-WATER BAG STORES PURE AIR, diverted into it while you blow used air out through exhaust valve. Large-diameter hose between mask and bag lets you draw freely on this reserve, making it unnecessary to regulate your breathing to air coming down.

Start by converting a standard snorkel

WHEN you invade King Neptune's world, you've got to take a little of your own world with you—its atmosphere. With a face mask you can see clearly, but you've still got to breathe. An air hose hooked up to a face mask will bring air down to you from a pump or compressor on the surface, but then you'll need a breathing bag to make breathing easy and a check valve to keep the air from running back up to the surface. An exhaust valve is needed, too, to carry used air out into the water without letting water into the mask. Finally, you'll find it hard work to stay below without a weight belt to neutralize your natural buoyancy. All these things make a diving outfit.

Exhaust valve. This is easiest to make, so you might as well get it over with right off. Cut a 2″ length of ⅞″-diameter clear-plastic rod and drill a ¼″ hole through it. Dab some rubber cement on the end and slip a rubber flutter valve or novelty-shop noise-maker over it. Don't drill the rod larger than ¼″ and don't use tubing instead, for water pressure might force the rubber valve into the bore, turning it inside out and letting water into the mask. Slip the valve into the snorkel socket on the left side of the mask and secure it with a 1¼″-diameter hose clamp.

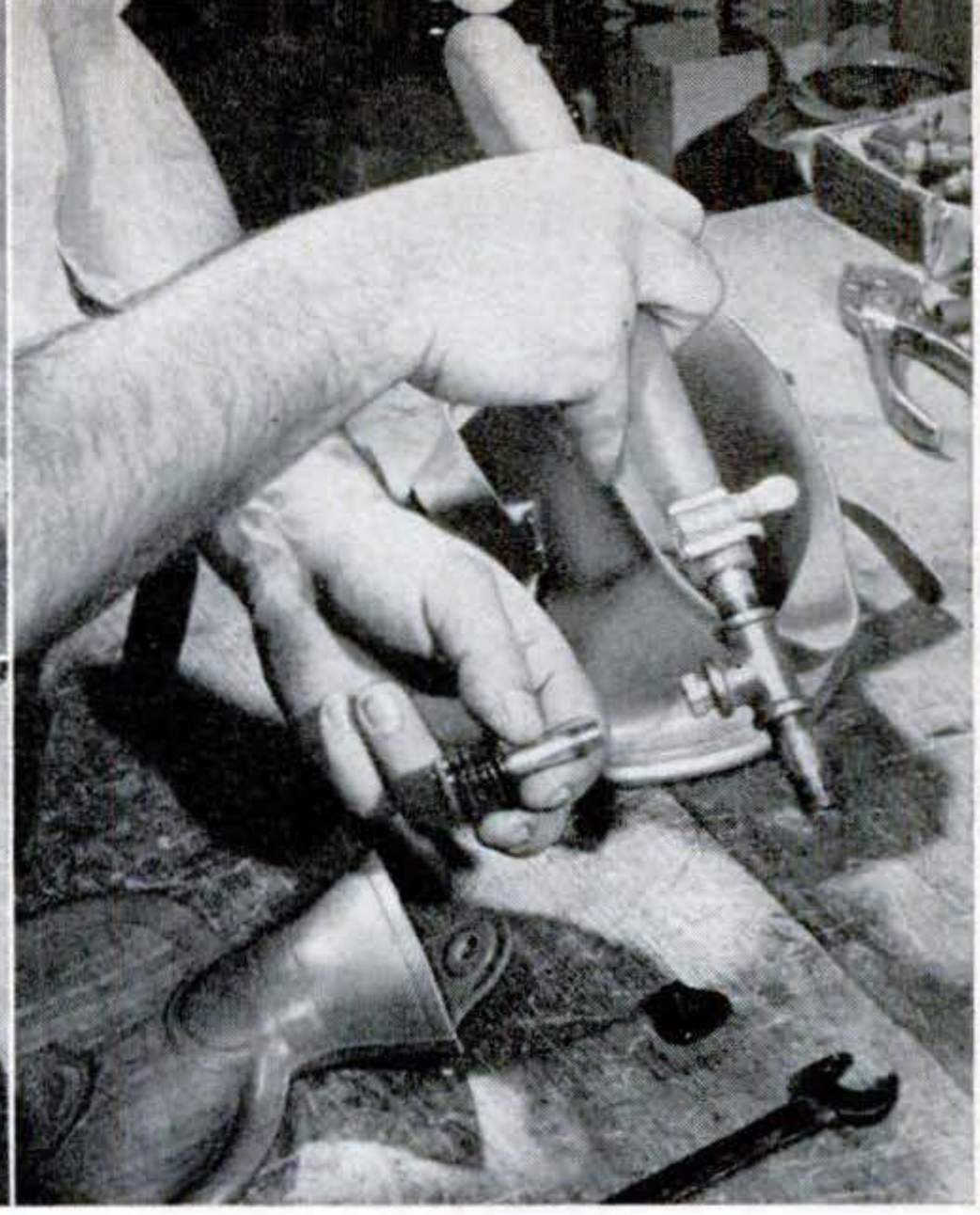
Air intake. Begin the intake line by drilling and tapping a 2″ length of ⅞″ plastic rod for a ¼″ pipe nipple. Slip it into the right-side socket on the mask and lock it in place with a hose clamp. Thread a 2″ piece of ½″-inside-diameter brass tubing to fit over the exposed end of the nipple already screwed into the plastic rod. Force one end of an 18″ length of clear-plastic or light rubber garden hose over the brass tubing and clamp it with a 1″ hose clamp. Make a similar arrangement of tubing threaded over a pipe nipple and slip this into the other end of the garden hose. Screw the exposed end of this nipple into a ¼″ brass pipe tee.

Check valve. Screw a ¼″ nipple into the opposite end of the tee and cut a 1¾″ length of plastic rod for the check valve. Drill a 7/16″ hole through the rod and thread both ends with a ¼″ pipe tap. Screw the threaded rod onto the tee and insert a light ⅜″-diameter brass spring and a ⅜″-diameter steel ball in the opening. Close the open end of the rod with the standard ¼″ air-hose fitting, countersinking its opening to form a seat for the ball.

Breathing bag. Use a 2-quart hot-water bag to capture and store the air coming from the pump while you are exhaling. Drill and tap the hard-rubber stopper for a short ⅛″ pipe nipple and screw the nipple into a ⅛″ to ¼″ bushing set in the center leg of the brass tee. Fashion the shoulder harness from 1″ web straps. Form a loop at each end of

Copyrighted material

DRILL AND TAP CLEAR-PLASTIC ROD with ¼″ pipe tap (top). Then screw brass nipple into it and thread a sleeve of ½″ brass tubing over nipple to fit into garden hose.



BRASS TEE joins breathing bag to air line. Drill and tap hard-rubber stopper and fit a ⅛″ nipple in it. Screw nipple into bushing in tee. Use Permatex No. 1 on all threads.

mask for diving

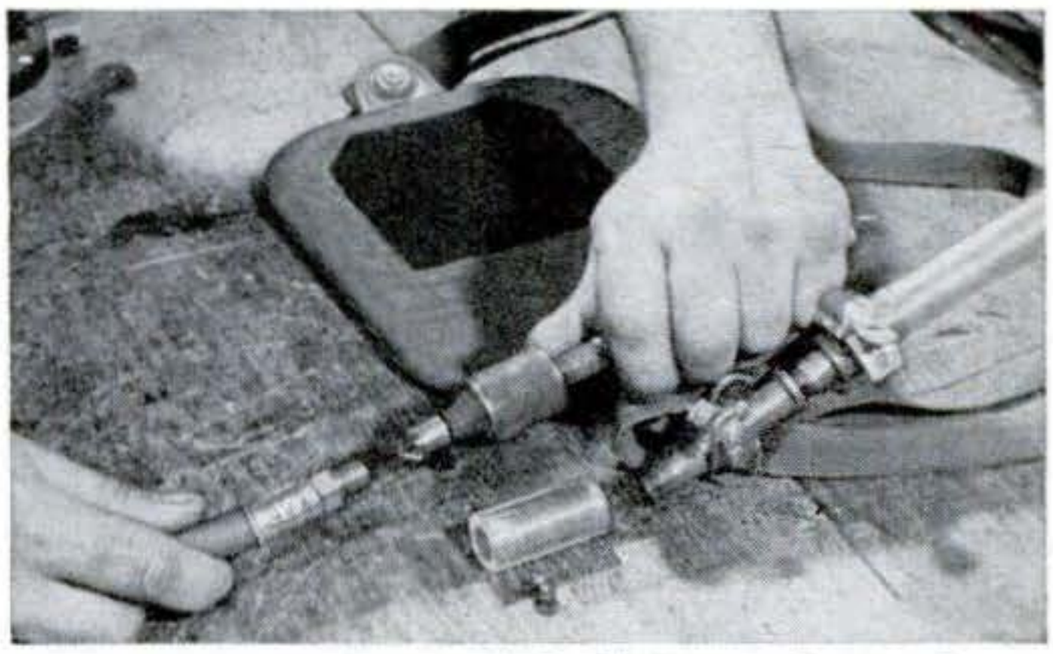
the hot-water bag and stitch a short piece of strap to each loop to buckle across your chest.

Weight belt. A 20-pocket shotgun ammunition belt makes a perfect weight belt. Fill all the pockets except one with 6-oz. fishing sinkers and run the air line (25′ of ⅜″-inside-diameter material hose) through the last pocket to relieve the mask of the shock of swimming out to the end of the air line.

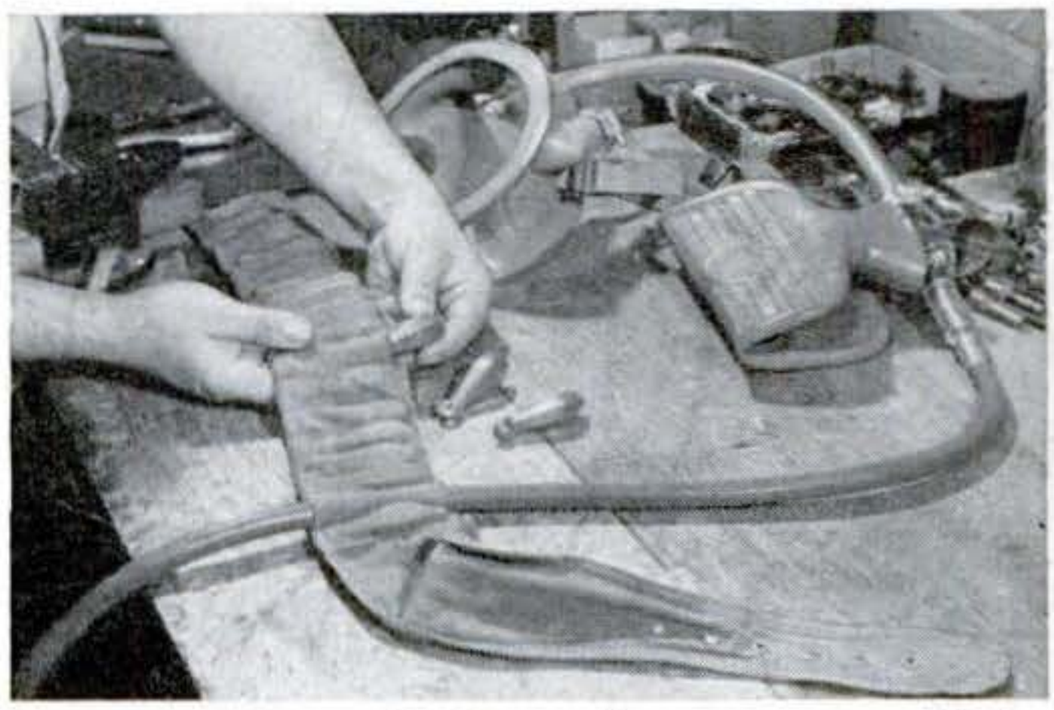
After the outfit has been adjusted to your size, wrap rubber tape around the hose above and below the belt to keep it from slipping out of position.

Additional weights. If you find that the fishing sinkers are not heavy enough to neutralize your buoyancy in the water with the breathing bag filled, cast a few extra weights by melting sinkers and pouring them into a metal soap dish. When cool, remove these weights and fasten them to your weight belt with brass screws.

When you put the outfit on, pull the free ends of the belt and the harness through their buckles and loop them halfway back on themselves again. Thus, if you should want to get out of the outfit, all you have to do is yank on the ends to pull them loose. Actually, though, unless you're caught on something, it's better to leave the outfit on to retain your underwater vision.



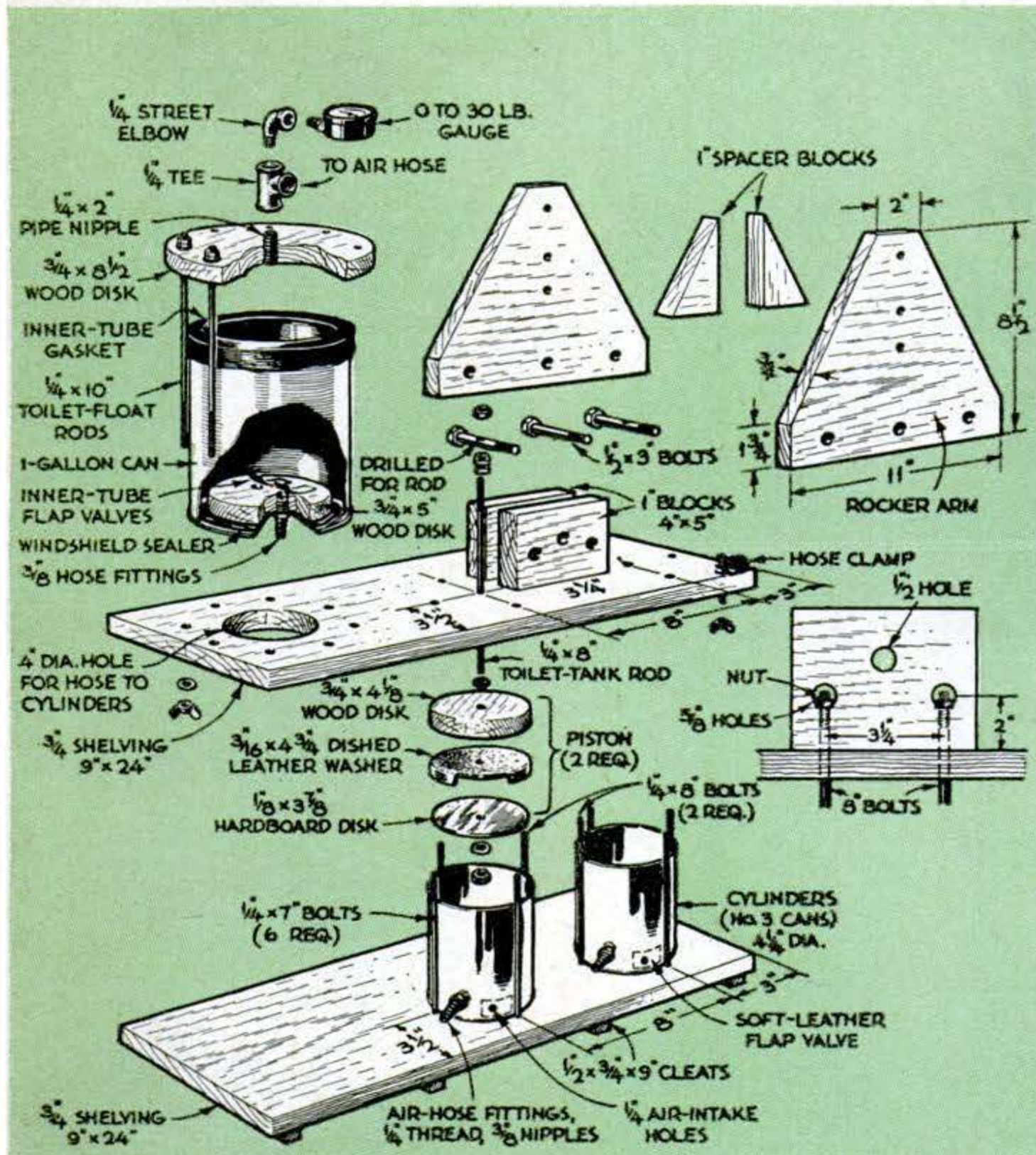
CHECK VALVE is steel ball housed in clear-plastic rod. Countersink end of air-hose fitting to form seat for ball. Light spring and ball are shown in foreground. Spring should be just long enough to let ball rattle loosely on seat. If too tight, it will restrict air flow.

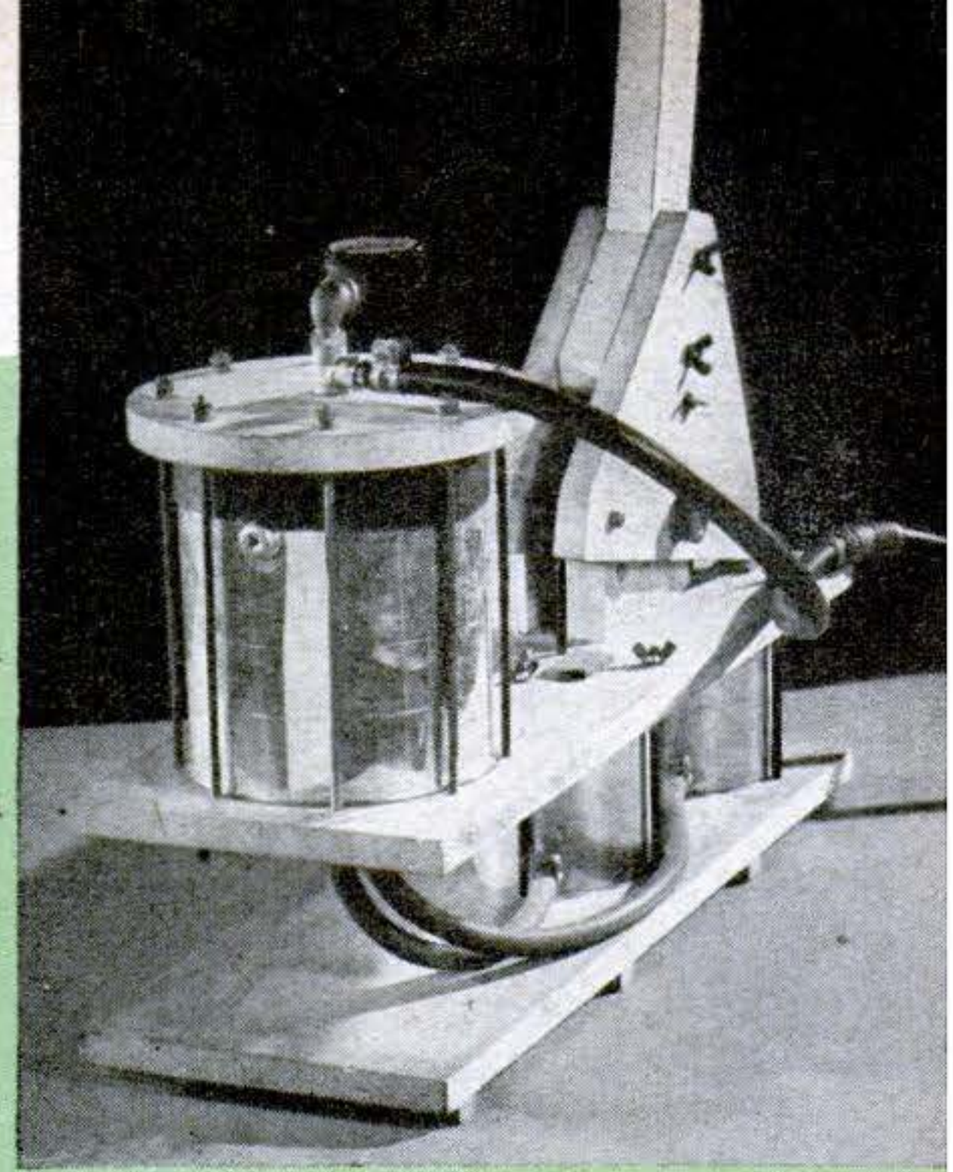


WEIGHT BELT, made from shotgun ammo belt, holds lead sinkers and keeps the air line snug against waist. Shock of swimming out to end of hose is taken by belt, eliminating the possibility of fittings being yanked loose from the mask or breathing bag.

Copyrighted material

How to build the pump





PUMP DELIVERS about one cubic foot of air per minute and can build up to 20 lb. pressure. Soft leather flaps over holes in cylinders let air in on upstroke, then close over holes on compression stroke, forcing air into large can. Rubber flaps over holes in disk inside large can let compressed air in on each stroke of cylinders, then close over holes to retain it. Handle, not shown, is piece of 1" by 2", about 3' long.

THE surface pump, a masterpiece of tin-cannery, is as important as the rest of the outfit—it sustains you while you dive. Its tin-can cylinders and wooden rocker arms are not a makeshift assembly, but rather a deliberate utilization of common materials put together with simple tools.

Cylinders. With a can opener, cut the tops out of two #3 vegetable or fruit cans and file the ridge around the top edge smooth. Drill holes for the intake and hose fittings, and cement a flap of soft leather beside each intake hole. Solder a hose fitting to each can.

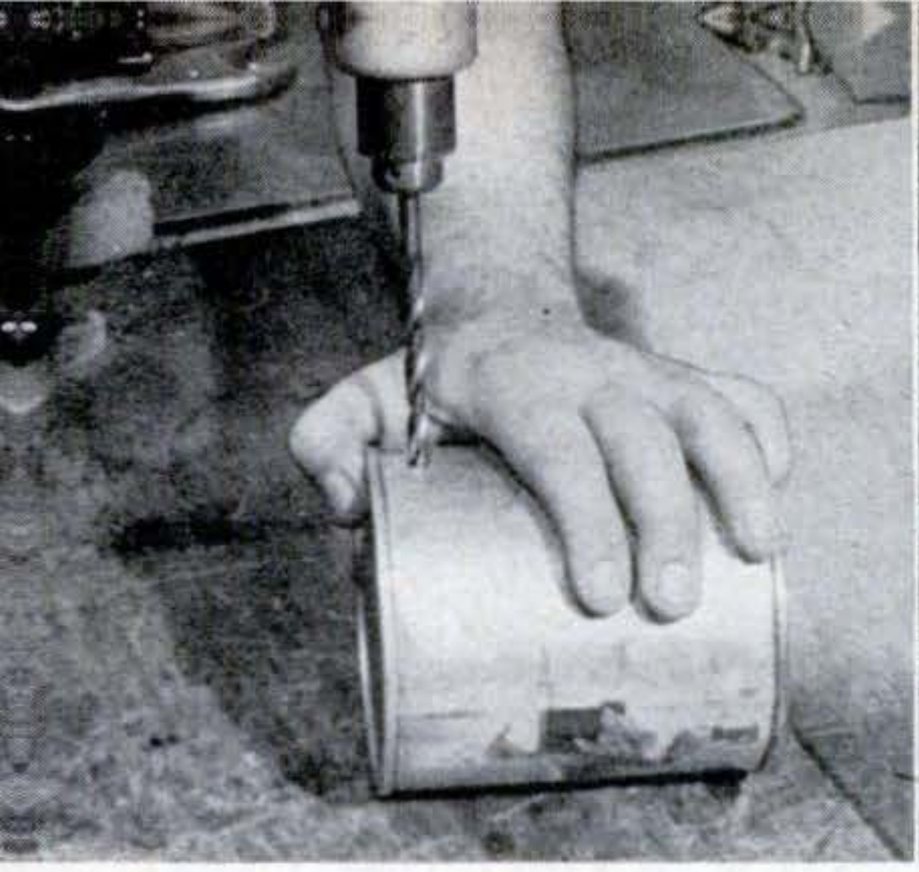
Pistons. Cut disks from scraps of shoemaker's leather for the piston plungers and soften them by rubbing with petroleum jelly. The softening can be hastened by soaking them in melted petroleum jelly kept warm over a low flame. Work them into a shallow dished shape and mount them on an 8" toilet-float rod sandwiched between a disk of wood and a disk of cardboard.

Accumulator can. Use a clean one-gallon paint can to equalize the pulse of the piston strokes and build up pressure for diving. New cans can be bought at paint stores for less than half a dollar. Air must come from the cylinders and accumulate in this can, so a set of one-way valves must be added to control the flow. Use rubber flaps about 1" wide by 2" long over holes drilled in a wood disk cut to fit inside the can.

Assembly. Clamp the cylinders between two 9"-by-24" pieces of ¾" shelving, using long bolts to pull them together. Lock the accumulator can in place by eight toilet-float rods, which also pull a wood cover disk down tightly on the top of the can. Bolt the rocker-arm bearings in place and lock the piston push rods in the rocker-arm bolts. The push rods must be adjusted by raising or lowering the lock nuts so that the rocker-arm ends come down on leather buffers on the top board before the piston hits the air fittings near the bottom of the cylinders.

The pump requires no maintenance, but the leather plungers should be kept soft.

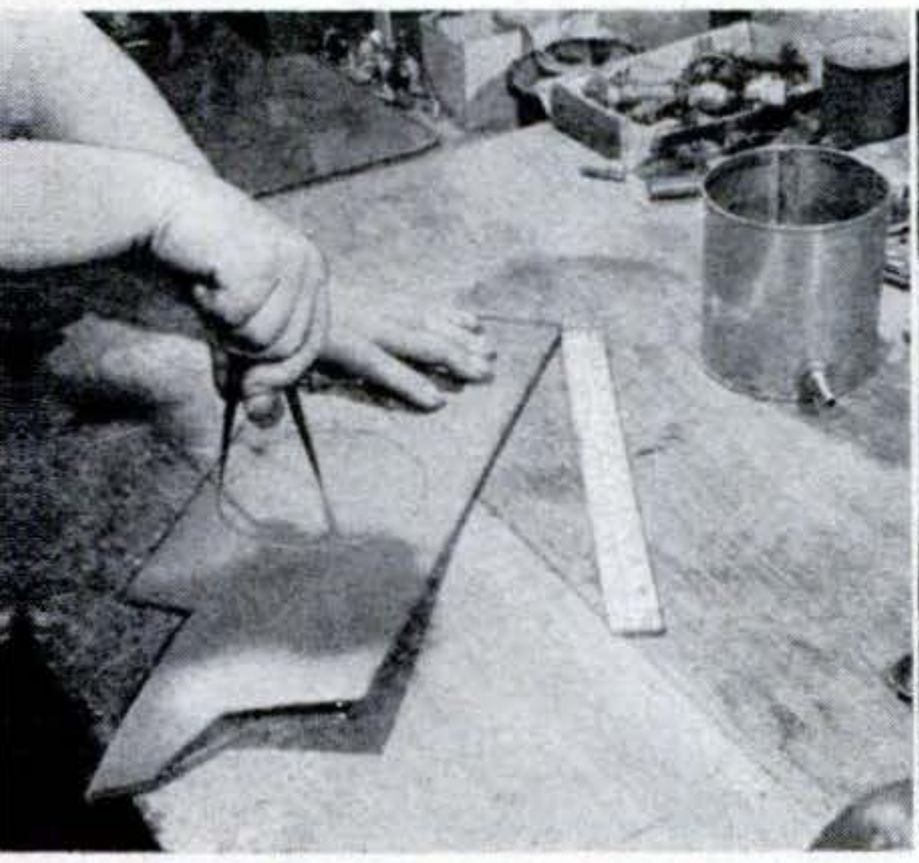
Copyrighted material



1 DRILL ¼″ and 7/16″ holes in side of each can ½″ up from bottom for air intake and hose fitting. Remove burrs and smooth ridge around inside edge of can tops.

2 SOLDER AIR-HOSE FITTING in 7/16″ hole, flowing solder generously on both inside and outside. Fittings, shown in foreground, are ¼″ pipe thread with ⅜″ nipple.

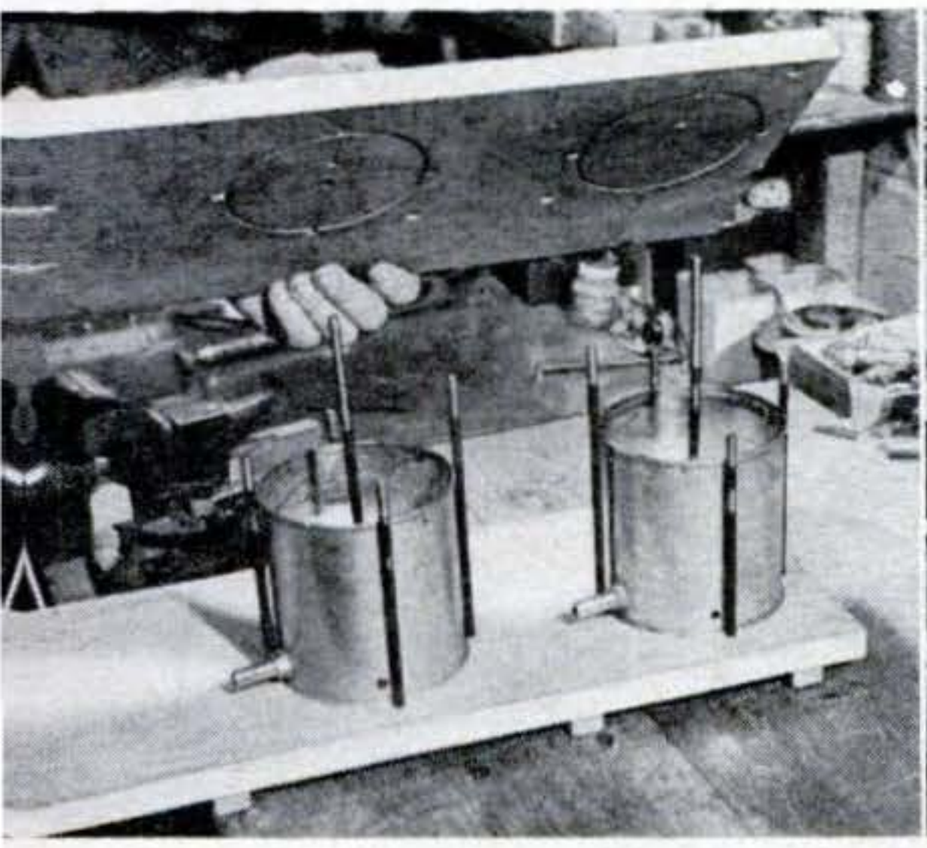
3 CEMENT SOFT LEATHER FLAP, ¾″ by 1½″, beside each intake hole, leaving about ⅓ of flap free over hole. Pliobond is ideal for joining leather to tin.



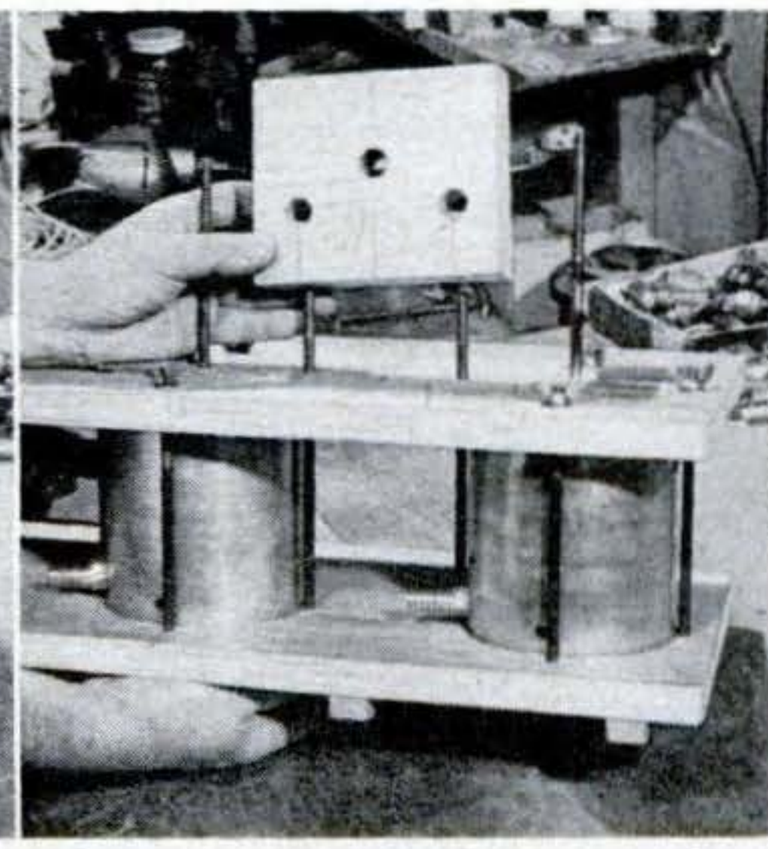
4 CUT DISK from piece of 3/16″ shoe leather, about ½″ larger than diameter of can. Score circle with pair of sharpened dividers until disk is cut through leather.

5 SOFTEN LEATHER DISK by rubbing well with petroleum jelly. When pliable, work the edge up into a shallow dished shape to form plunger. Drill a ¼″ hole in center.

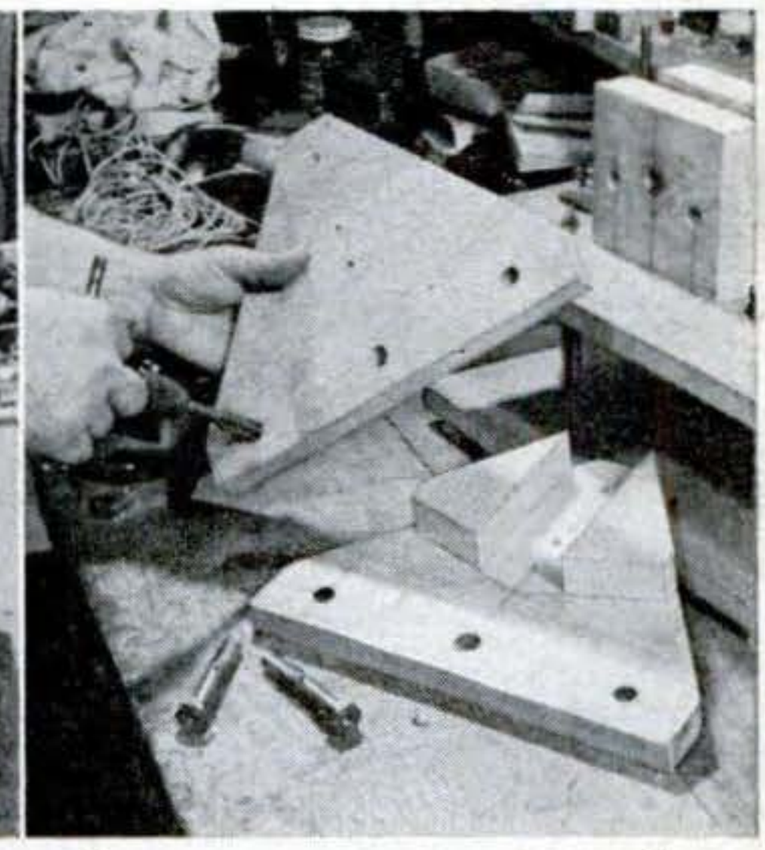
6 SANDWICH PLUNGER between 4⅛″ disk of ¾″ pine and 3⅞″ disk of ⅛″ hardboard. Try fit in cans, substituting larger hardboard disk for tighter fit.



7 FIT TOP BOARD over cylinders after inserting pistons. Grooves to fit top edges of cans can be scored with dividers, then deepened with narrow chisel.



8 MOUNT PIVOT BEARING for rocker arm on long bolts coming up from base. Lay nuts edgewise in holes and thread bolts into them. Other bearing is held by short bolts.

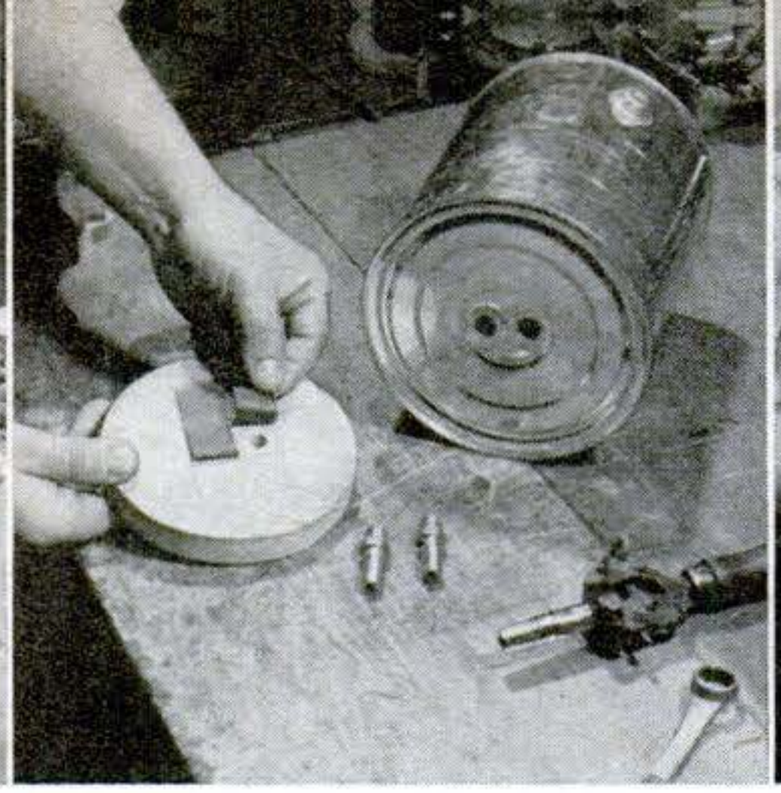


9 CUT ROCKER ARMS from ¾″ pine. Drill ½″ clearance holes in one arm and tap ½″-13 thread in 7/16″ holes in other arm. Glue blocks on one arm to brace handle.

Please turn the page for more pump photos.

Copyrighted material

10 ASSEMBLE ROCKER ARMS on pivot bolt. Drill two outer bolts for ¼″ piston push rods and insert rods after screwing bolts in rockers. Adjust piston stroke with nuts on push rods.

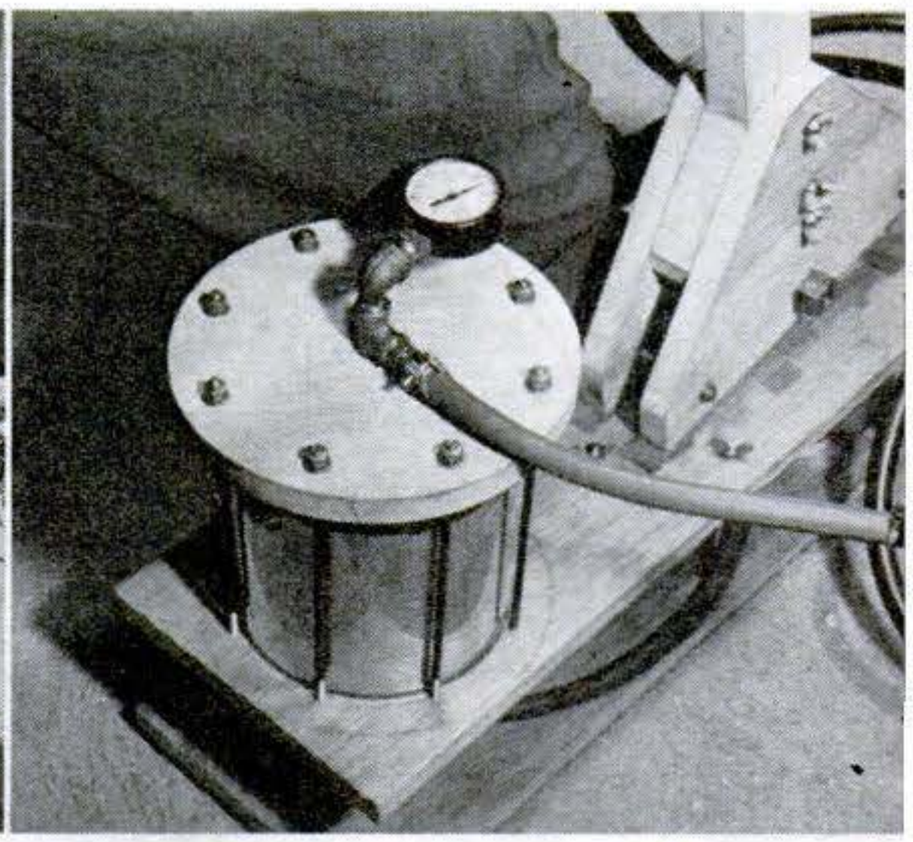


11 CEMENT RUBBER FLAPS over 7/16″ holes drilled in wood disk cut to fit inside large can. Tap these holes with a ¼″ pipe tap and drill mating holes in bottom of can.

12 SPREAD AUTO-TOP SEALER generously over the bottom of the wood disk and press it down on the bottom of the can. Screw two hose fittings into the wood disk.

13 HOLD THE CAN IN PLACE with eight 10″ toilet-float rods. These rods also pull the cover disk tight on the can. A band cut from inner tube makes an airtight seal.

14 CONNECT THE CYLINDERS to the large accumulator can with short lengths of ⅜″ hose. Drill a 7/16″ hole in the cover disk and tap it for a ¼″ pipe nipple in tee.



15 TWENTY POUNDS' PRESSURE shows on the gauge as the pump gets a test workout with the hose kinked. In use, only ½ lb. is needed for each foot under water.

YOU CAN USE A SMALL COMPRESSOR, a diaphragm type for oil-free air, and skip the hand pump. Fit out the mask exactly as shown for use with the hand pump and attach the air hose directly to the compressor. Excess air will blow out.

Where to Get What You Need

Medusa mask: Aqua-Gun Co., 1120 N. B'way, Yonkers, N.Y., or Abercrombie & Fitch Co., 45th St. and Madison Ave., NYC.

Material hose: Eastern Auto Stores, 25 School St., Glen Cove, N.Y., or Sears, Roebuck.

Hose fittings, clamps and pipe nipples: same as above.

Shotgun ammo belt: Lemp's Rod & Gun Shop, 9 West Glen St., Glen Cove, N.Y., or most rod-and-gun shops.

Toilet-float rods: any hardware or plumbing-supply store.

Clear-plastic rod: Berton Plastics, 585 Sixth Ave., NYC, or most hobby-and-craft shops.

Rubber flutter valve: Abercrombie & Fitch Co., or use novelty-shop rubber noisemaker.

Copyrighted material

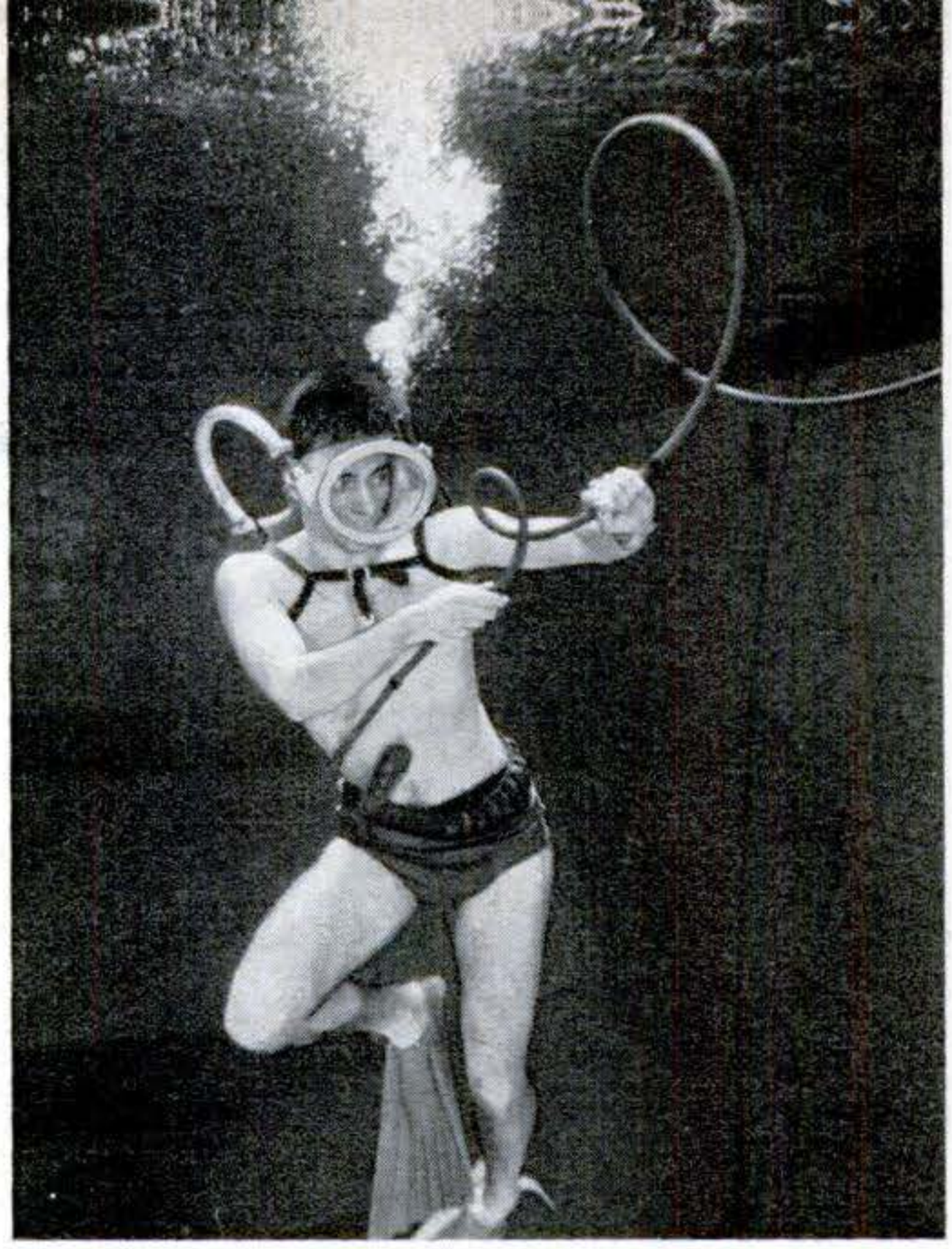
How to use your outfit

DIVING is like driving—once you know how, you can really enjoy it. Try your first dive in shallow water about neck deep to get accustomed to the outfit. Roll around to see how the breathing bag functions in different positions. You'll find a swimming position is best, as the bag is higher in the water than the exhaust valve. Standing erect or rolling over on your back puts the bag lower than the exhaust valve and the slightly greater water pressure flattens it, forcing your air reserve out the exhaust valve.

Take your next dive in water that you know is about 20 feet deep. A good idea for all your dives is to suspend a brightly colored weight in the water on a 20-foot line; that way you'll always know your depth.

The ⅜″ hose will float, so there's no need to worry about it getting snagged on the bottom. Just throw all the hose into the water and take what you need down with you. Watch your hose, though, for kinks. As you swim around, it will coil loosely. Then, if you should swim out and pull it taut, those coils may tighten into kinks that stop the flow of air. Should this happen, swim quickly toward the hose and the kinks will loosen. Pressure that built up in the accumulator tank will then surge down to you, filling the bag and your lungs.

Going down, at about eight or 10 feet, you may feel pain in your ears. Normally, your ears will pop themselves clear, but sometimes a bit of coaxing is needed. Stop descending when pain is felt and rise a foot or two, working your tongue and swallowing. This should open the tubes and, once cleared, they'll continue to equalize themselves on the way down. If your head is congested from a head cold, give it up for the day or limit yourself to cruising just beneath the surface. Don't use ear plugs—they'll do more harm than good.



WATCH THE AIR LINE. Swimming in circles can coil the hose above you. Then, when you swim out to its limit, the coils tighten into kinks. Try to swim in figure 8's to avoid this.

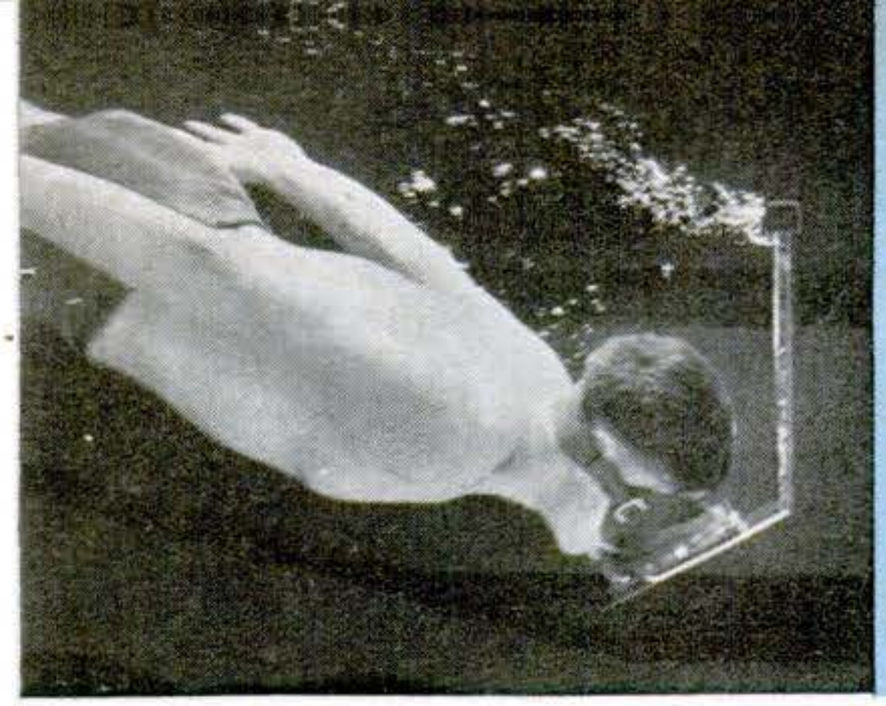
Tips for your pump tender

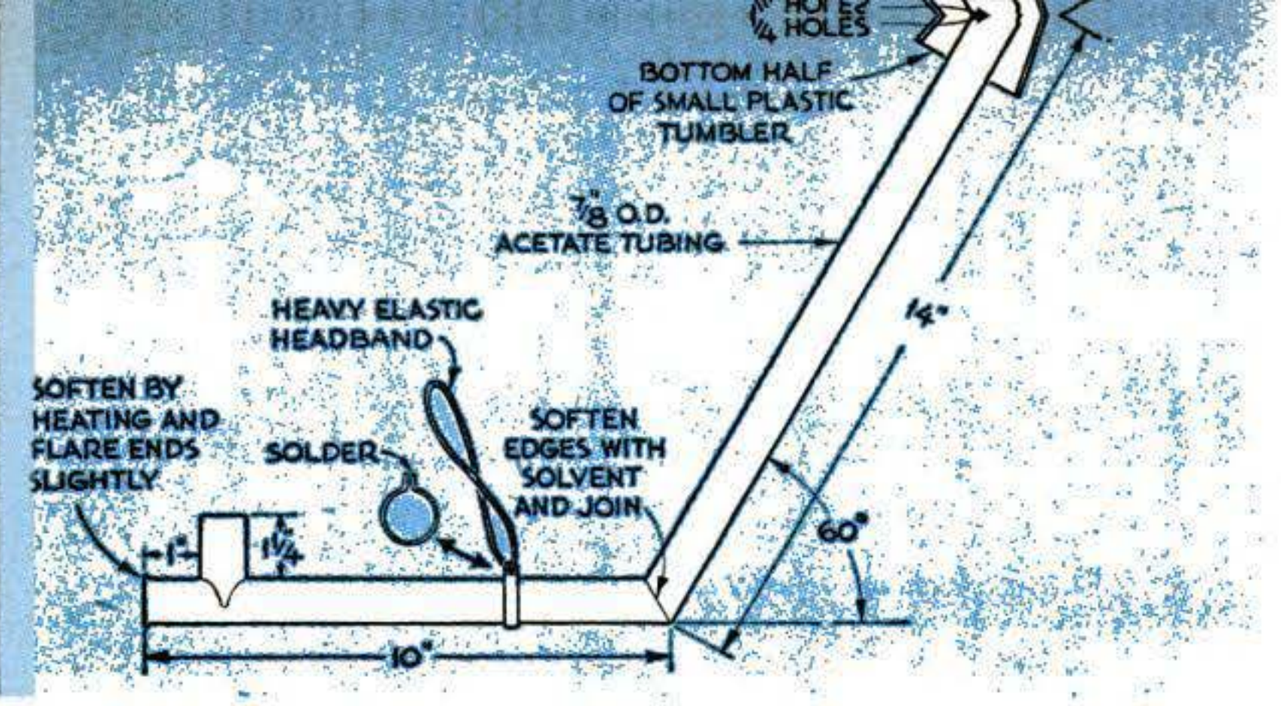
YOUR pump tender must be a conscientious fellow. No great strength is needed to man the pump, but a certain amount of attention must be given to the job. Brief him before you go down so he'll know what's expected of him. The pressure gauge on the accumulator tank tells him how you're doing below. When you're 10 feet down, the gauge should show about five lb. pressure.

If your air line should kink, it will show at once by a higher-than-normal reading on the gauge. The tender should continue pumping until about 20 lb. has built up in the tank. By that time you'll have discovered your plight and slacked off on the hose to loosen the kink. Pressure will then drop to what it was before the line kinked and the tender should continue pumping normally. A steady 60 full strokes (out and back on the handle) per minute will give you plenty of air, but as you go lower (as indicated by a gradual increase in gauge pressure) the tender should pump a bit faster and make sure that he's taking the full stroke to give you the last punch of air from the cylinders.

A good idea, too, is to have someone watching you on the surface through a look box. This way, if you do get into trouble, help can come at once.

Copyrighted material





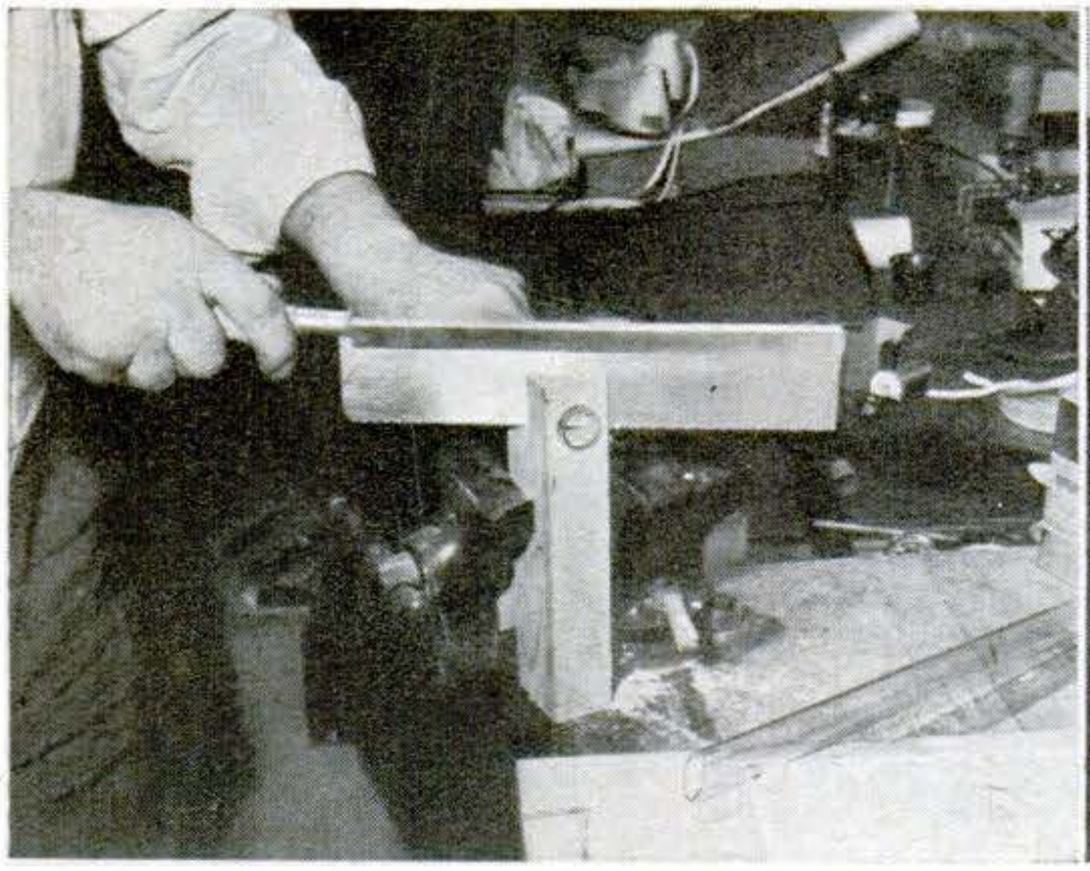
Build your own snorkel

WEARING a face mask, you can *peek* into the watery wonderland, lifting your head every half-minute or so for air. But with a snorkel to reach above the surface for your air, you can quietly swim or float face down and breathe normally for hours.

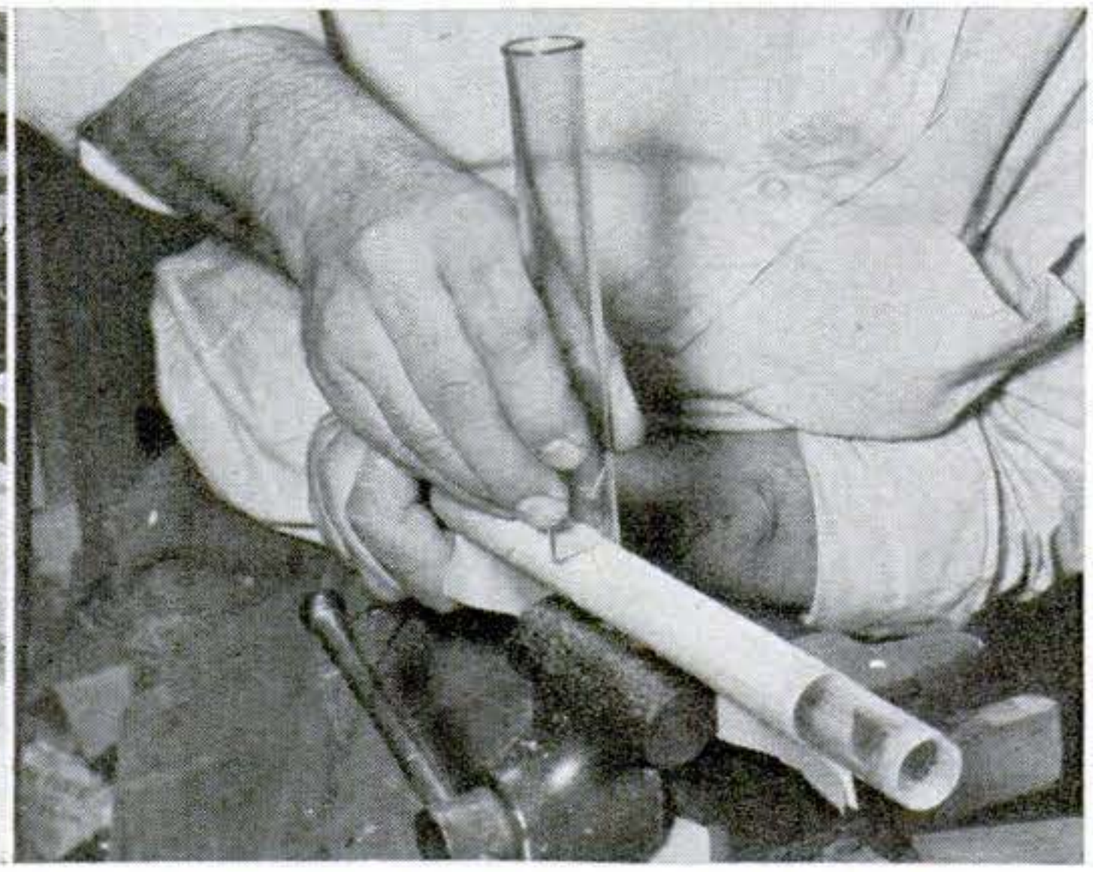
The snorkel is made from three pieces of acetate tubing, joined with acetone or ethylene dichloride. Draw the snorkel full size on a sheet of paper tacked to a flat board. Nail strips of wood along the lines to make a jig for joining the parts. Cement half of a small plastic tumbler to the top of the snorkel to trap air and hold back water when you dive.

Using a snorkel is no trick at all. Just cruise along the surface with the top of the tube projecting out of the water. If something below interests you, take a deep breath, hold it and dive. When you return to the surface, exhale vigorously to blow through the flutter valve any water that may have entered tube. Practice in shallow water and learn to clear tube with one puff.

Acetate tubing and solvent can be obtained from Berton Plastics, 585 Sixth Ave., NYC; mouthpieces from Aqua-Gun Co., 1120 N. Broadway, Yonkers, N.Y.; flutter valves from Abercrombie & Fitch Co., 45th St. and Madison Ave., NYC.



CUT TUBING by inserting it in hole drilled in block of wood. Angle of cut is marked on top of block, which is used like a miter box.



FIT MOUTHPIECE TUBE to snorkel body by rubbing it on medium sandpaper wrapped around piece of scrap tube.

JOIN PARTS in jig laid out on flat board. Soften edges in solvent and press them firmly together for several minutes. Drill hole for mouthpiece tube *after* cementing it to body. Drill holes around top before adding cap.

SOFTEN BOTTOM OF TUBE by heating and press it lightly against bench to flare end for rubber flutter valve. Slip valve and mouthpiece (foreground) on snorkel and bend brass strip to form ring for elastic headband.

Copyrighted material

How to make your fins

WHETHER you're a novice or expert, swim fins will add thrust to your kicks. An easily made pair that will open your eyes to the possibilities in these kickers can be made by cementing rubber flippers to a pair of rubber-soled tennis shoes. Fins can be flexible, like these, or as stiff as a board. The stiff kind really push you through the water, but great leg power is needed to use them.

CUT FLIPPERS from heavy auto mat. Inside edge of flipper runs parallel with foot. Outside edge starts even with heel and tapers out to about 10″ across the front edge, resembling a large 30°-60° triangle with rounded corners instead of points. Trace outline of soles on flippers and rub soles and meeting area of flippers with coarse sandpaper.

APPLY TWO COATS OF PLIOBOND to soles and flippers, wait a few minutes for it to get tacky and press tennis shoes on flippers. Insert blocks of wood cut to fit in shoes.

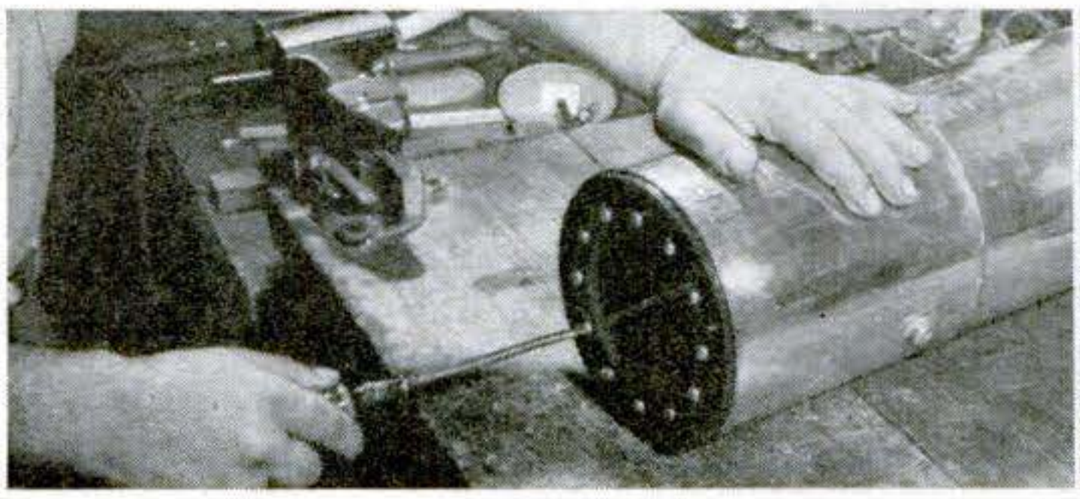
USE CLAMPS on blocks to press shoes flat and let cement dry for 24 hours. Short lengths of garden hose, slit along one edge, can be cemented over edges of flippers for stiffness.

How to make your look box

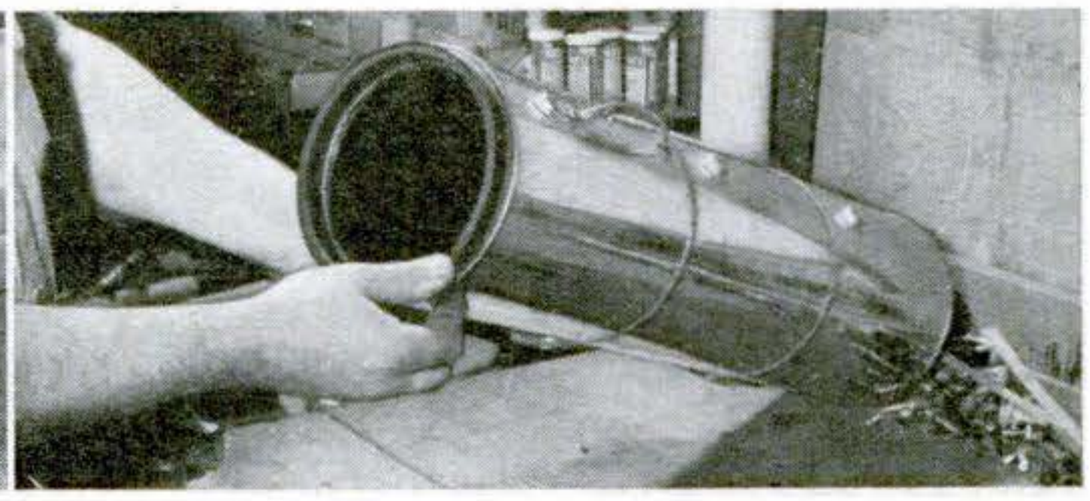
PEEP into the briny without getting wet with this look box made from three one-gallon paint cans soldered together. Dip it an inch or so into the water to eliminate reflections; you'll see as clearly as a diver.

Cut the bottoms out of the paint cans and join them with tinning solder flowed on with a hot iron. Fit a clear-plastic disk in the bottom, add handles, and cement sponge rubber around the top to protect your face.

CUT BOTTOM CAN with circle cutter rotated by hand to leave 1″ flange for attaching window. Use can opener on other cans to remove bottoms completely. Drill 12 holes in flange and ¼″-thick plastic disk for screws.

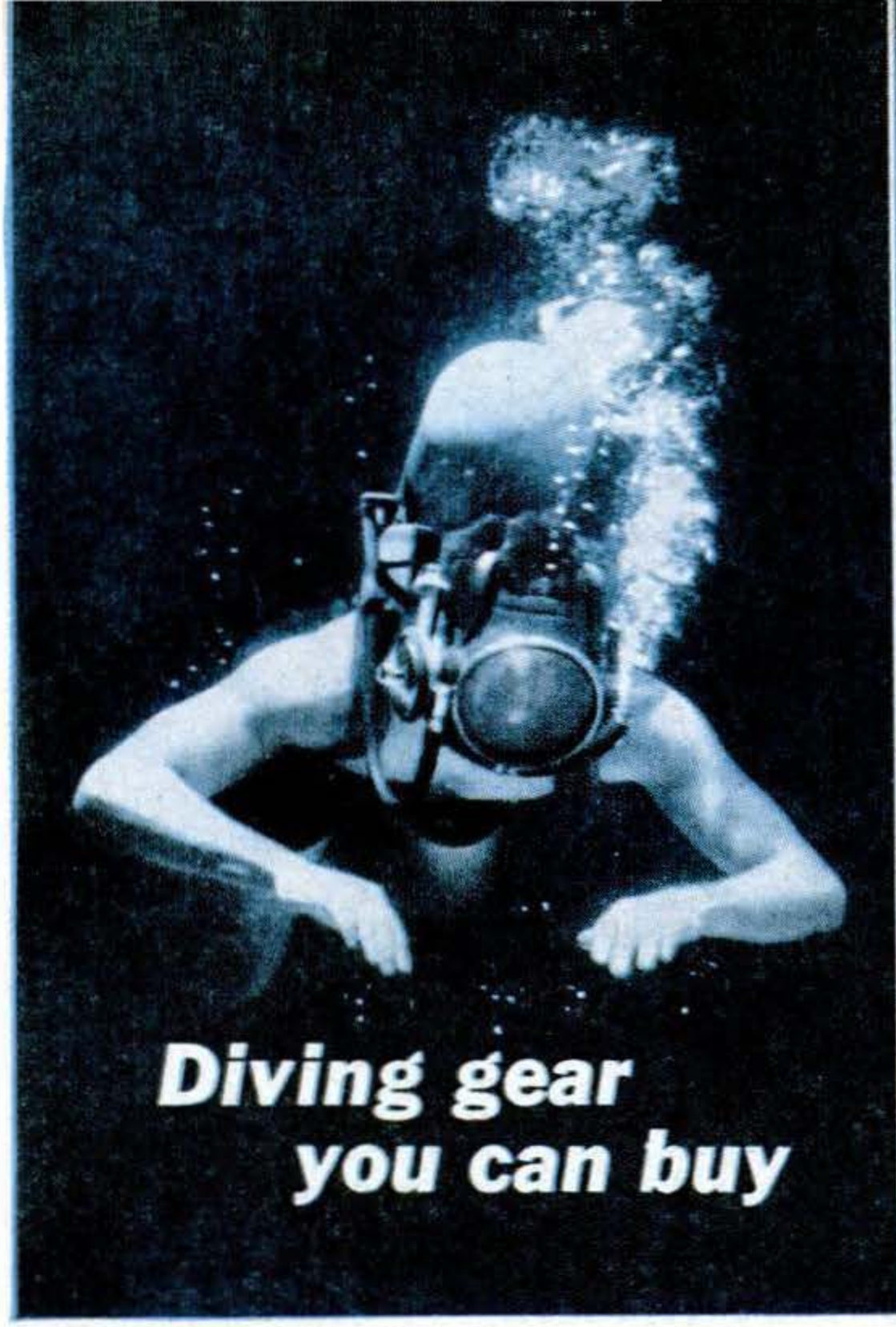


USE BRASS SCREWS AND NUTS to fasten window on flange. Apply auto-top sealer to the flange before attaching window.



CEMENT A SPONGE-RUBBER STRIP around the top can to protect your face against the look box's bobbing on the water's surface.

Copyrighted material



Diving gear you can buy

1. HYDRO-PAK IS NEW. Air is supplied to a full-face mask with safety-glass window, providing easy, natural breathing. The demand valve has a button for shooting air into the mask to blow out water. Snorkel conserves tank air while on surface. A regulator reduces pressure and a reserve valve cuts in last ¼-tankful of air. Price: about $250.

2. AQUA-LUNG has been used by skin divers for many years. Air is drawn through a mouthpiece linked to a demand valve by two hoses. Separate mask is used for seeing underwater. Demand valve has a regulator to reduce tank pressure, and a rod-actuated valve cuts in reserve air. Both units use compressed air, not oxygen. Price is $160.

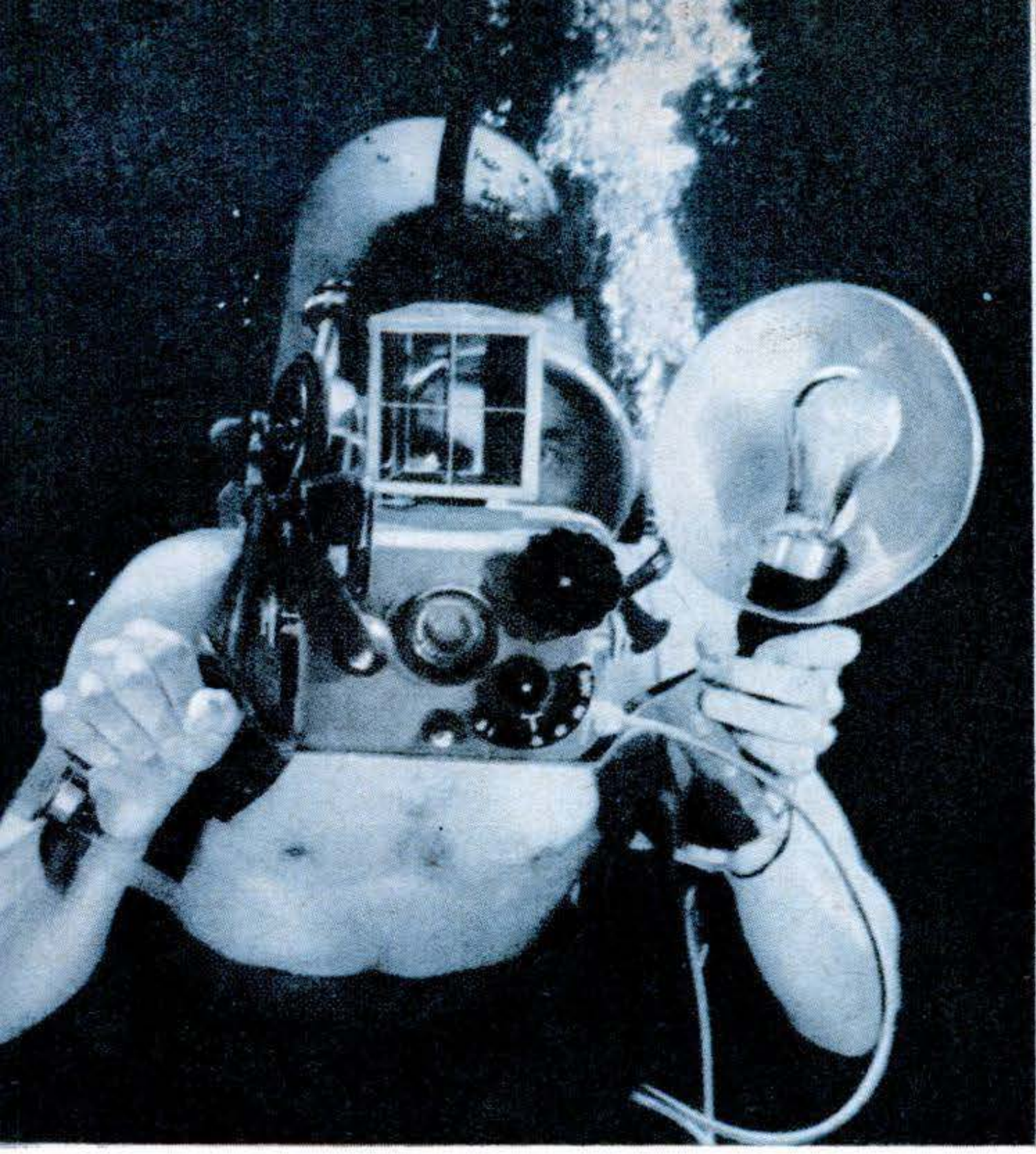
4. KNOW YOUR DEPTH at all times with this easy-to-read plastic depth gauge you wear on your wrist. As pressure increases, water enters a tube which is read like a thermometer. It sells for about $3.50.

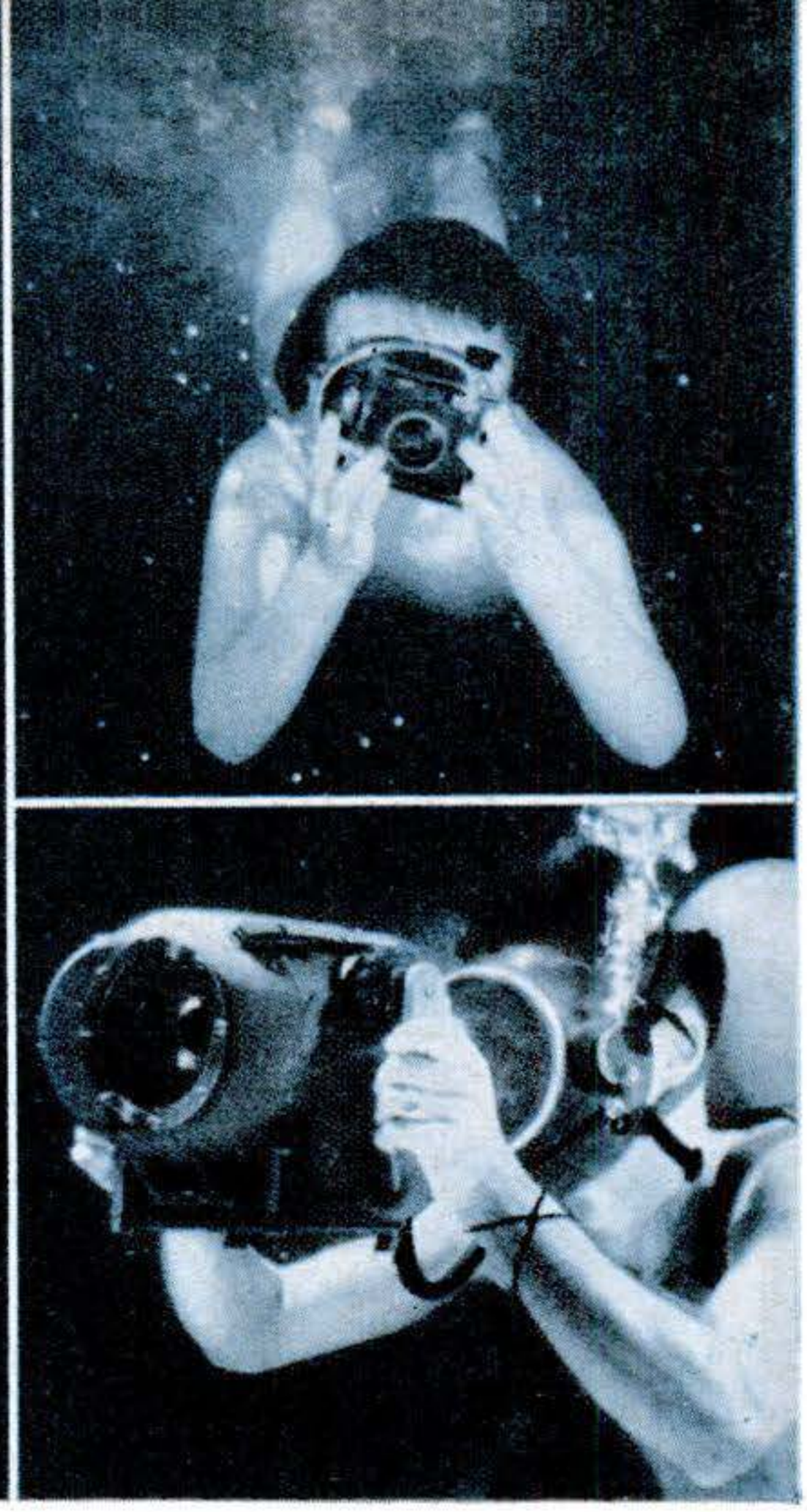
5. TIME YOUR DIVES with your own watch tucked into this watertight watch case. The price is $10.50 without watch. It is needed to allow ample time in coming to the surface from deep dives.

6. LIFE PRESERVER will float a 250-lb. man. Packed no larger than a pack of cigarettes, it inflates instantly when squeezed. The price is $2. It is the only life preserver a diver can wear under water.

Further information on these diving outfits and accessories can be obtained from: 1. Scott Aviation Corp., 8300 Erie St., Lancaster, N. Y.; 2. U. S. Divers Co., 1045 Broxton Ave., W. Los Angeles, Calif.; 3. Fenjohn Underwater Photo and Equipment

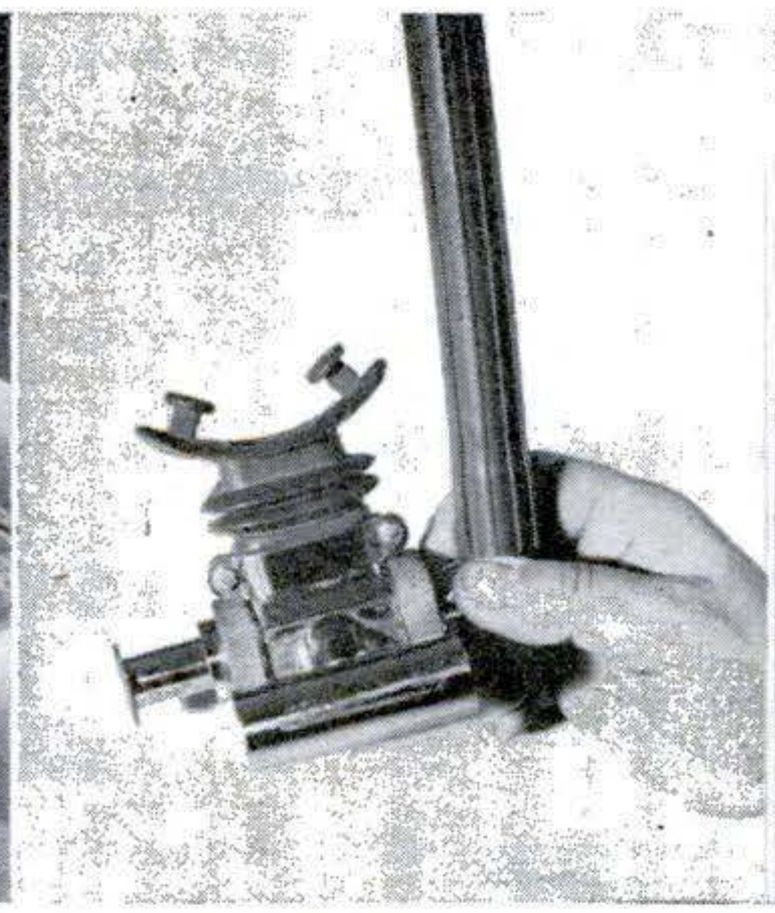
Copyrighted material





3. UNDERWATER CAMERAS. Anything from a Brownie snapshot to professional 16-mm. movies can be taken in 15 or 20 feet of clear water without additional light. The camera above takes 2¼"-by-2¼" still photos. Controls for lens, shutter and film wind are outside the watertight housing. Price is $675. The synchronized underwater flash gun is an extra. For $29.95 you can capture underwater sights on film with a box Brownie fitted in a clear-plastic box (top photo). For the man in the chips, the 16-mm. movie camera in the lower photo is an electrically driven job priced at $1,990. A nest of 18 flashlight batteries powers the motor. Camera is controlled by knobs on the outside.

7. DIVING VEST keeps the Aqua-Lung or Hydro-Pak tank snug against your back for easier swimming. A quick-exit zipper frees the vest in a flash. It comes in one size, with side adjustments, at $25.

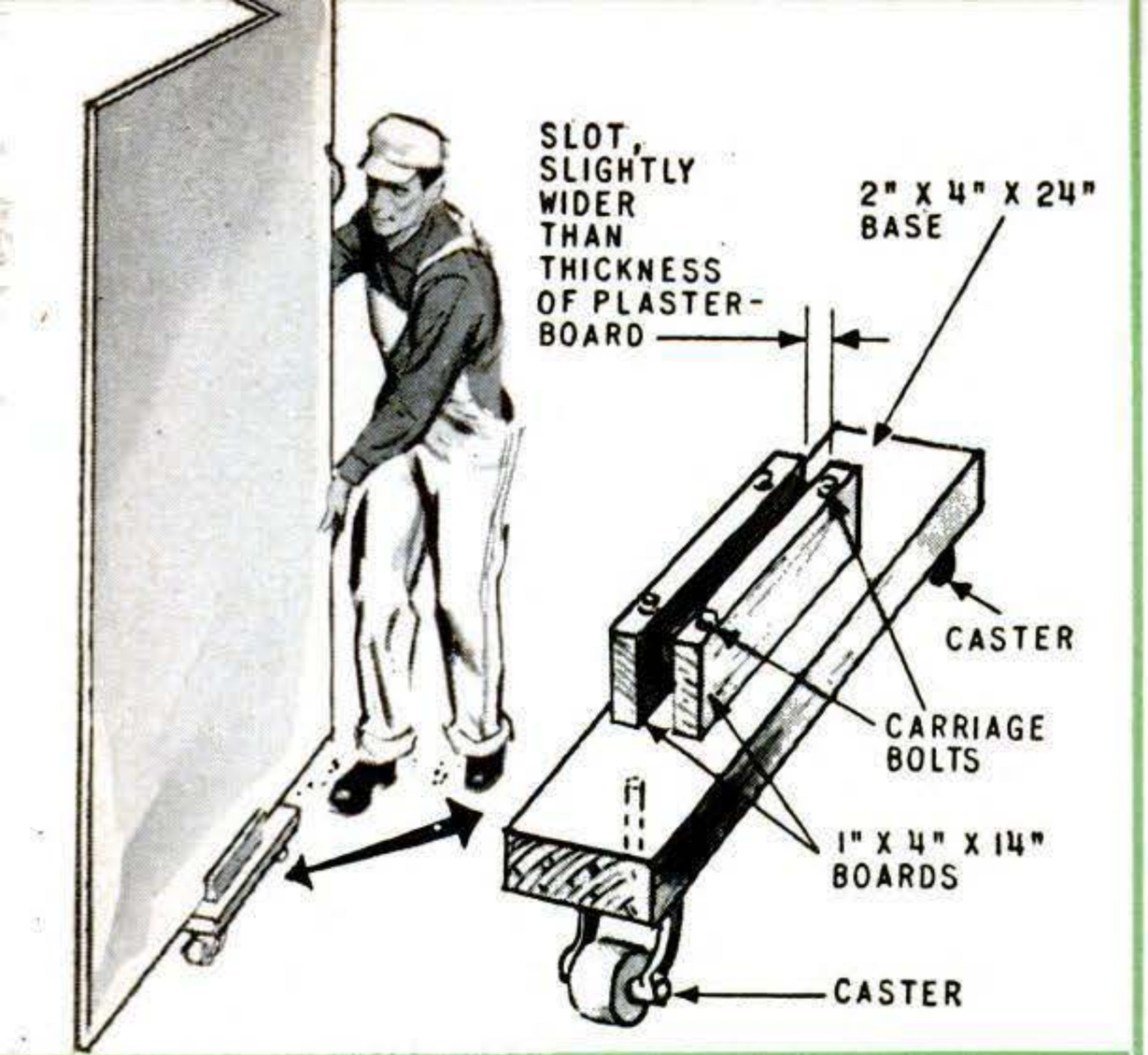


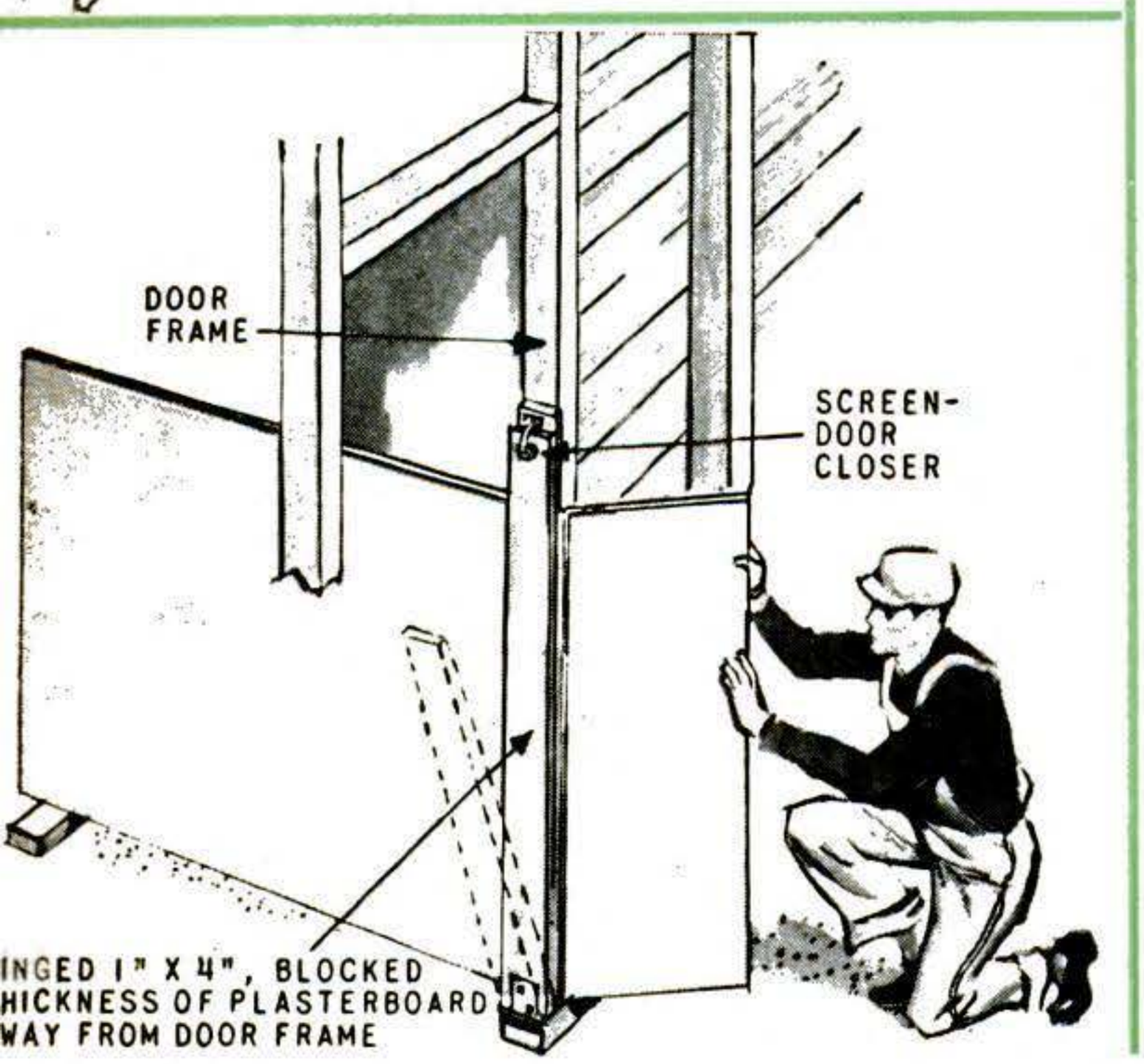
8. SNORKEL FOR AQUA-LUNG conserves air when you swim on the surface, is a necessity when you swim back to base with empty air tanks. It replaces the old mouthpiece on a breathing hose ($15.50).

9. SEE EVERYTHING CLEARLY, if you wear glasses, by having your optician mount your prescription lenses in this plastic eyeglass adapter. It fits snugly against window of Squale mask. Price: $3.50. END

Corp., 90 Cricket Ave., Ardmore, Pa.; 4. Abercrombie & Fitch Co., 45 St. and Madison Ave., NYC; 5 to 9. Fenjohn Corp. or Abercrombie & Fitch Co.

Copyrighted material





Two Useful Tips for Handling Plasterboard

If you build or remodel with plasterboard, a special dolly will make it easier to move the unwieldy sheets from the stockpile to the place where they will be put up.

Mount a pair of furniture casters under a 24″ piece of two-by-four. Then nail or bolt two one-by-fours on edge to the top surface, spacing them a little farther apart than the thickness of the plasterboard. Rest the panel in the slot while moving it.

An easily made jig will speed up the job of scoring and breaking that is required to fit the panels.

Locate a plumb doorway frame with room on either side for a full sheet of plasterboard. Nail a block temporarily to the floor, snugging it up against one side of the door frame. Select a 50″ piece of one-by-four with a perfectly true edge and hinge one end of it to the floor block ½″ away from the door frame (the thickness of the plasterboard).

Swing up the one-by-four against the door frame and attach a screen-door closer to hold it there and provide tension against the plasterboard after the panel is inserted in the scoring jig.

After scoring the panel along the straightedge, apply hand pressure and a clean break will result.

Then pull the panel a few inches farther through the jig to cut the paper behind the break in the plasterboard.—*W. G. Waggoner, Sacramento, Calif.*

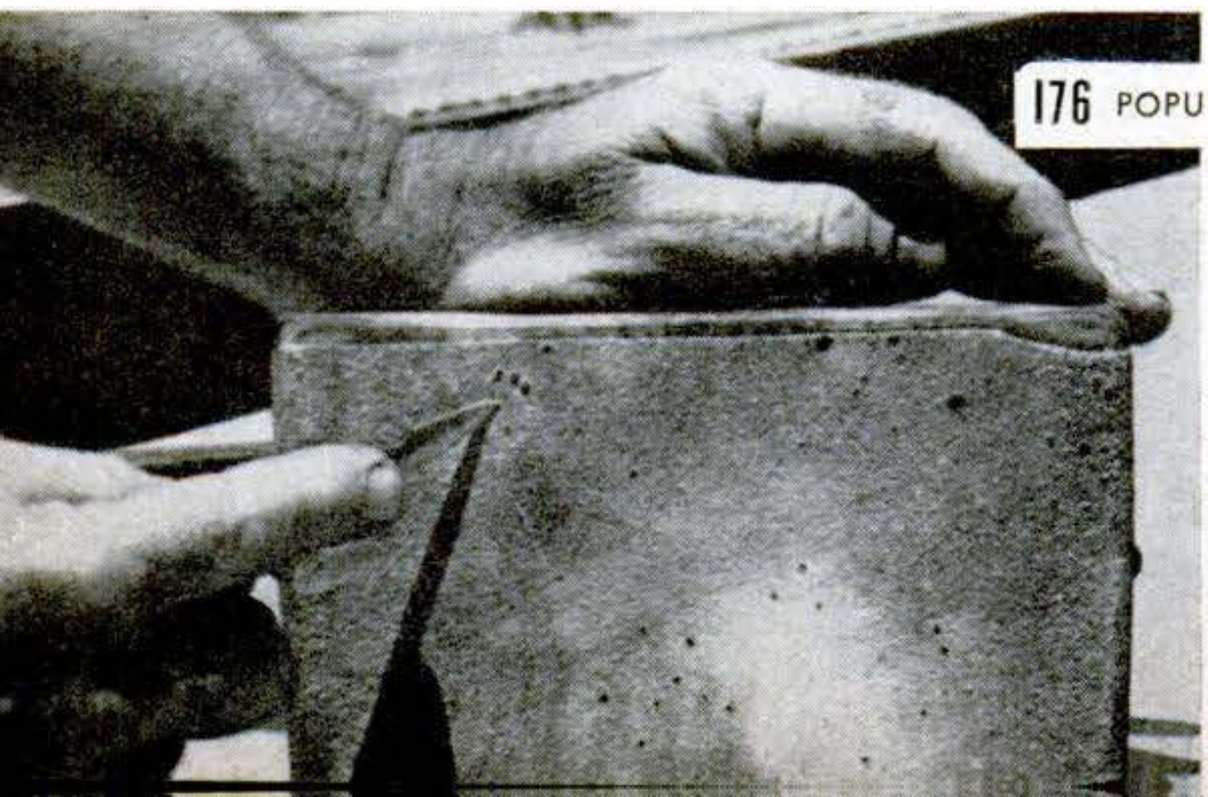
Smooth Sandpaper Works Better

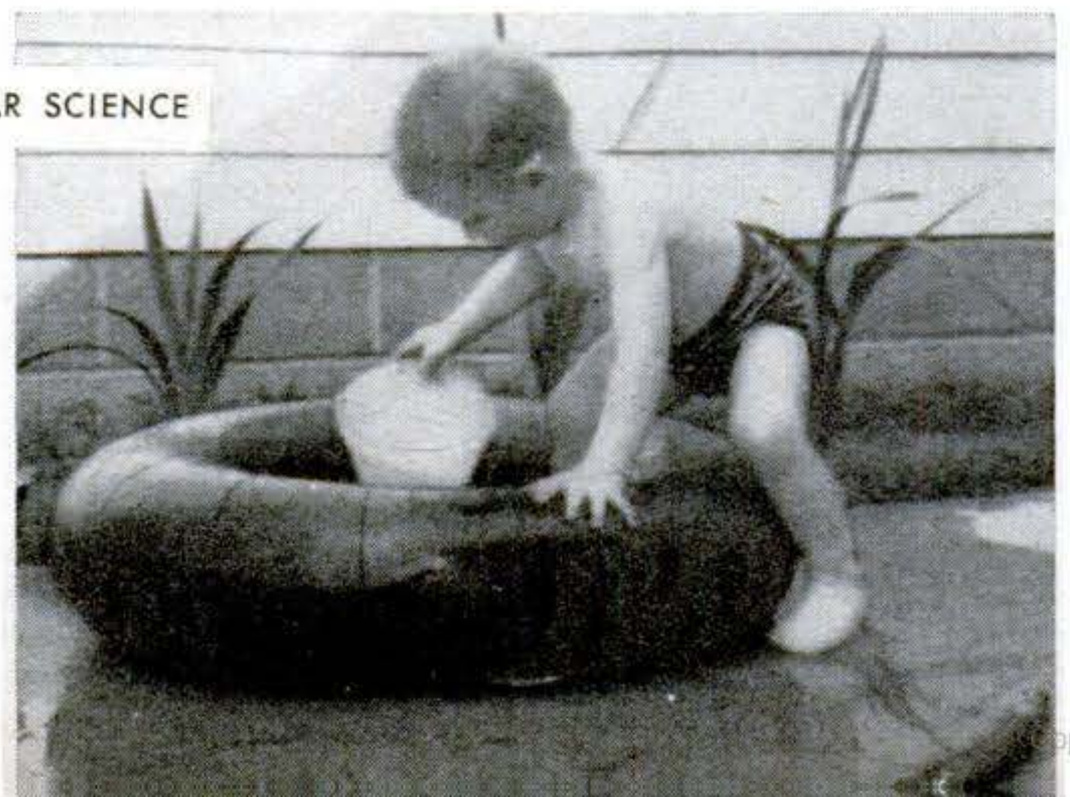
Most sandpaper has a few larger grains in the surface that quickly collect paint and build up high spots, preventing the rest of the paper from touching the work and often causing scratches.

If you keep chipping off these spots as they appear, the result will be a much faster and smoother sanding job.—*Clinton R. Hull, Costa Mesa, Calif.*

Inner Tube Makes Small Pool

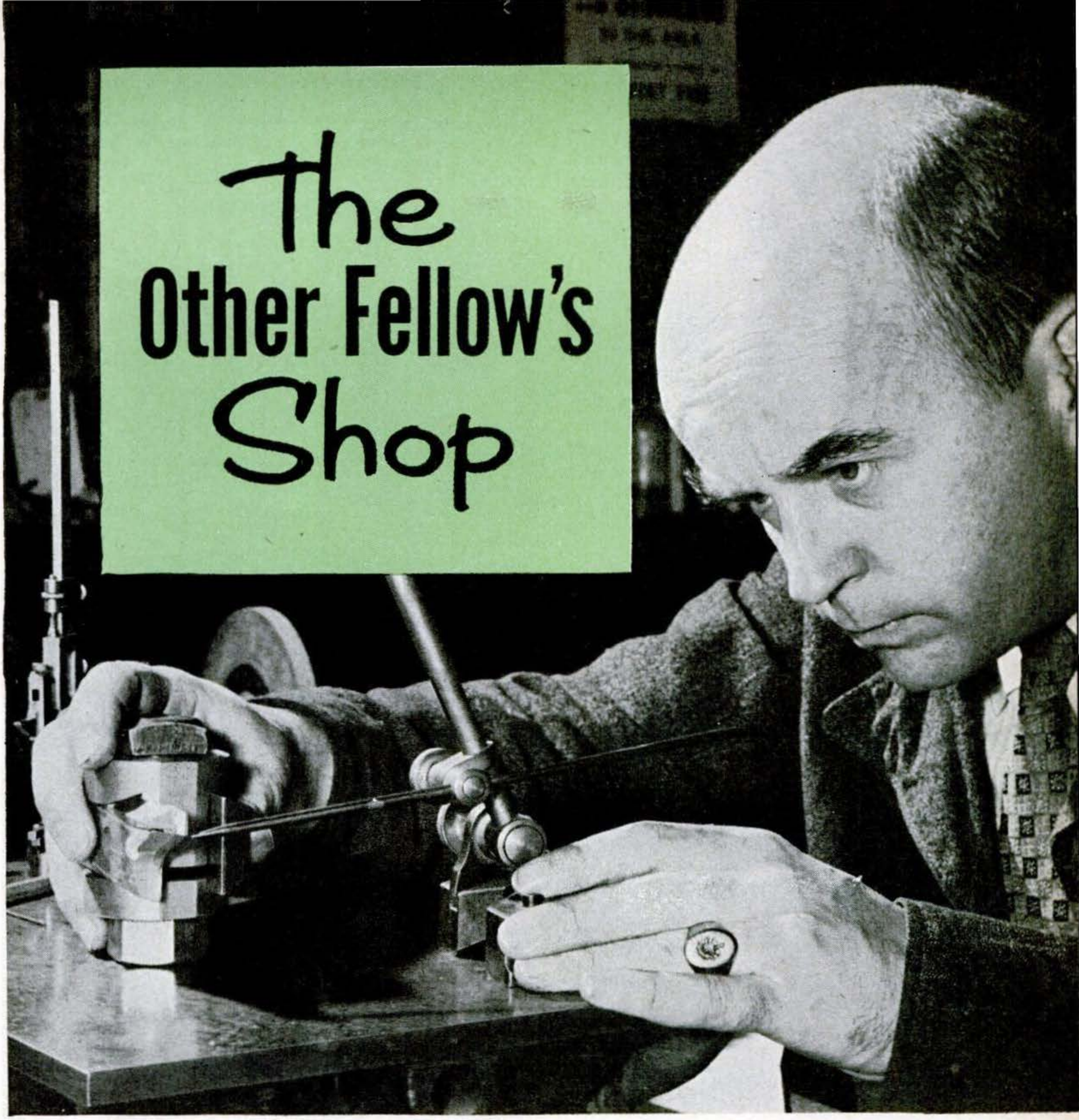
Our 18-month-old was a bit young for the bigger wading pools, so we decided to start him out in this small splash-size one made from an inflated inner tube. For a watertight bottom, I cemented a sheet of plastic from an old furniture cover to one side of the tube, then covered this on both sides with fabric to prevent wear.—*Daniel L. Weaver, Cleveland, Ohio.*





Copyrighted material

The Other Fellow's Shop



Winthrop Johns started designing new tools in his basement shop. Now his former hobby keeps a small factory humming.

By George H. Waltz Jr.

MOST of us like to boast about how big our home workshops are and how they've grown from year to year. But Winthrop Johns of Plainfield, N. J., points with pride to the fact that his home shop has grown smaller!

Four years ago, Win Johns' shop was not unusual. He had so much equipment crammed into his basement that you almost had to edge in sideways to clear the machines. He had a machine lathe, a standing drill press, a

high-temperature brazing furnace, a planer-jointer, a homemade circular saw.

Now he has only one small bench, a saw and a planer-jointer in his basement—and seldom uses them for anything except minor repairs.

Where did all the rest of his stuff go?

Down the road a half-dozen miles to a former small truck terminal.

Why?

Because Win Johns' hobby became his business. He now devotes every day to it and has several helpers.

Win Johns had not built a better mousetrap—although he has some pretty definite ideas about that—but he had recognized some unfilled needs of other home workshoppers, and he's now in the business of filling those needs.

Johns started to build up a home workshop as a hobby during World War II when, just a few years out of Massachusetts Institute of Technology, he was a design and production engineer for a diesel-engine company in New Brunswick, N.J. His first motorized tool was the homemade circular saw that he still has. He rigged it up out of an old washing-machine motor and a grinding-wheel arbor. After a day spent wrestling with engineering problems at the diesel shop he liked to go home and putter around.

But he never seemed to have the right size and kind of dowels on hand. He liked to use dowels of the same wood as the work. To solve the problem, he designed and built a simple dowel maker—a sort of overgrown pencil sharpener that would whittle wood scraps held in the chuck of a lathe or drill press down to dowel lengths of the desired diameter.

That simple new idea started the transformation of his shop into a small factory. When the war ended and military produc-

More Americans are spending more time and money on home workshops every day. There's more variety in these shops than in TV shows, and a man's shop is often the most novel and interesting part of his home.

This is the second of a series of articles about outstanding home workshops, from which everyone who has a shop may pick up a few helpful pointers.

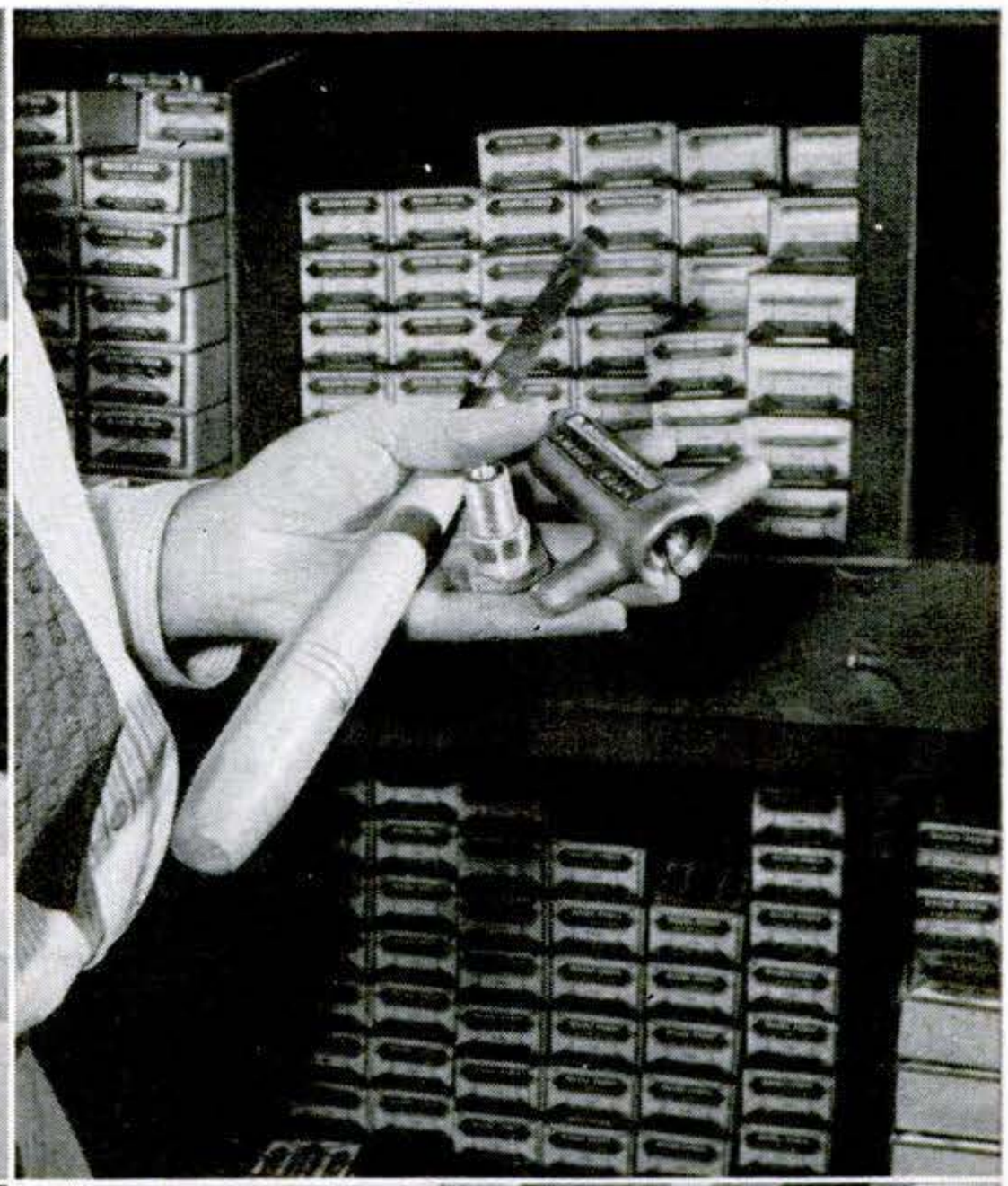
See POPULAR SCIENCE MONTHLY *next month for a story on another fellow's shop.*

8:30 A.M. **After an early-morning stop at the post office, Winthrop Johns goes to one of the desks in the office of his small factory and sorts his mail. The office has four desks and he shifts from one to the other depending on the job he is doing.**

10:30 A.M. **With office duties out of the way, Johns and his one full-time employee take time out for a coffee break in the factory's combination kitchen and chemistry lab. During this period Johns reads up on advertising and merchandising.**

Copyrighted material

9 A.M. Johns confers with his part-time Girl Friday who serves as shipping, mail and file clerk. The stock bins in the background used to line the walls of his basement home workshop where he started his business. Photo at right shows three products of the Johns Mfg. Co.: carbide-tipped wood-turning tools, a dowel maker and an acid-neutralizing oil-drain plug for automobiles. His own toolmaker, Johns at times contracts to make carbide-tipped production tools for other plants in the neighborhood.

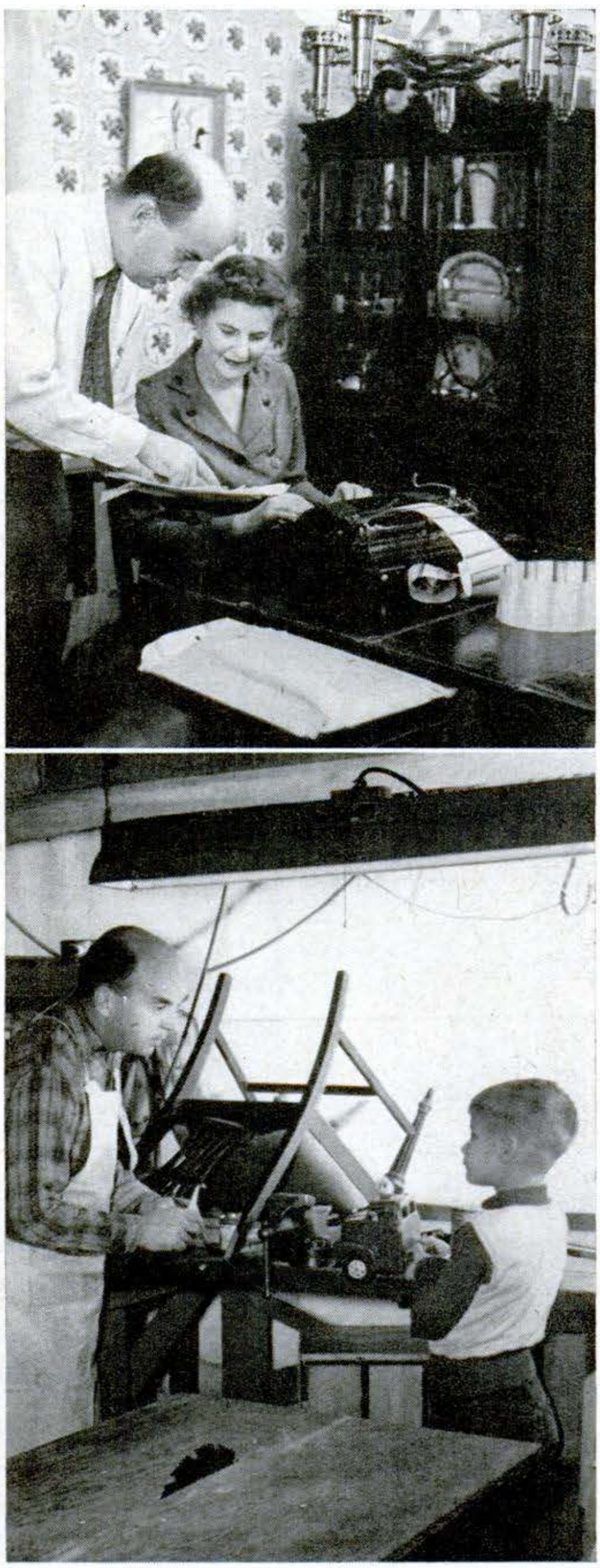


10:45 A.M. To keep up production, Johns dons a work coat and helps out his hired hand by taking a turn at the lathe, putting the finishing touches on some dowel makers. The lathe and drill press are part of his original basement workshop.

11:30 A.M. Johns explains the workings of his brazing furnace to his helper. It is used for silver-brazing tungsten-carbide tips in place on woodworking tools. This furnace also once stood in his workshop. *(Please turn the page.)*

Copyrighted material

8 P.M. **Each night, Mrs. Johns types out the mailing labels for the orders received during the day. She also handles a great deal of the Johns Mfg. Co.'s correspondence. With three children to take care of, it makes a full day for her, too.**



WHERE IT ALL BEGAN—the basement of the Johns home. Win's home workshop now consists of just a bench, his original homemade circular saw (foreground), and a planer-jointer. His family sees to it that he keeps his hand in with repairs on furniture and toys.

tion was cut back, Johns placed three small seven-line ads in POPULAR SCIENCE MONTHLY describing his dowel maker. The response was so encouraging that he made arrangements to have the main body of his dowel cutter cast in a local casting shop and invested $202 in a secondhand metal lathe and a drill press to do the finishing work.

In three months, he made, hand-assembled, and sold close to 500 of his dowel makers. After a full day of manufacturing, Johns, with the help of his wife when the children were bedded down, would shift to another cramped corner of the basement set aside as the shipping department.

Carbide Tips for Wood-Turning Tools

Then he had another idea. The one thing, he reasoned, that takes some of the fun out of wood turning is keeping the tools sharp. Why not produce wood-turning tools with tungsten-carbide inserts—tools that would hold their edges almost indefinitely? Tests convinced Johns that he could make them at an attractive price. The main trick was in silver-brazing the carbide tips in place.

By May, 1947, Win was in full basement production—turning out a series of 10 tungsten-carbide-tipped wood-turning tools as well as the dowel maker. To meet demands, he finally had to rent space in a nearby machine shop.

Then he turned to another pet idea. While working for the diesel company he had become interested in the basic causes of engine wear. Experiments had shown him that engines running at high temperatures operated cleaner and with less wear. Heat, he reckoned, cooked off moisture in the engine. Since water itself isn't too harmful he decided that there must be something in the water—perhaps acids—that helped to cause engine wear and damage. So he looked for ways to neutralize acids.

His Own Car Serves as Test Lab

Using his new Ford as a guinea pig, he began dropping pellets of potassium hydroxide (a second cousin to lye) into the oil in the crankcase. But the potassium hydroxide was so strong a base that it began to eat away the engine's timing gears and other aluminum parts.

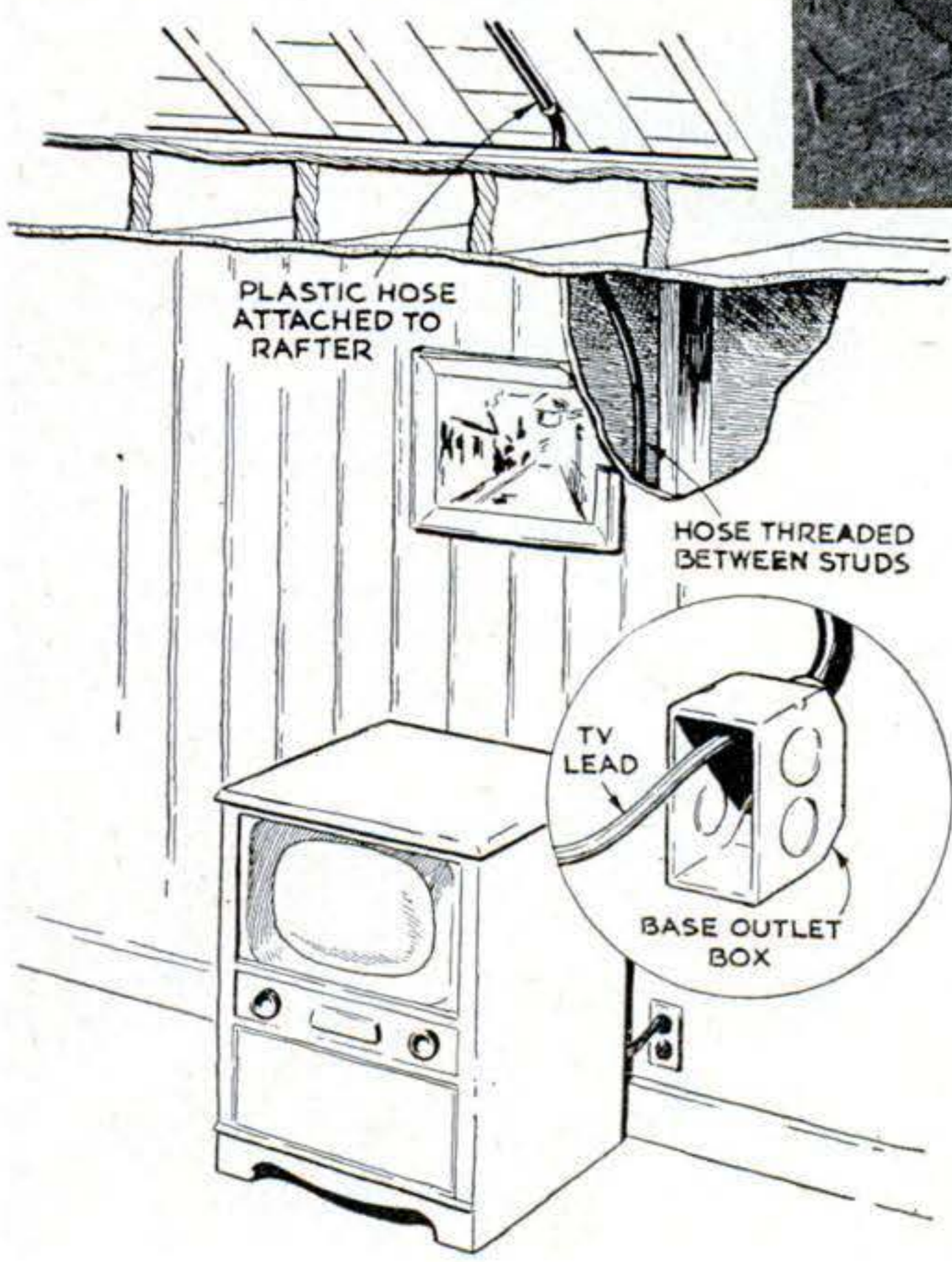
He thought then of putting some metal that is easily attacked by acids—such as magnesium or aluminum—into the crankcase so that any acids present would attack

[Continued on page 268]

Copyrighted material

Spot Gardening Cuts the Cost

SOIL-CONDITIONING chemicals are expensive if you spread them at random over a wide area. But you can save a lot, says the U.S. Department of Agriculture, if you place the chemicals in small, individual hills just big enough for each plant. Large-rooted vegetables like tomatoes and cabbages need a hill 18″ to 24″ wide, smaller plants as little as 12″. A sifter makes a good spreader, then mix the soil to a depth of 6″ and wait a day or so before planting.



Plastic Hose Takes TV Antenna

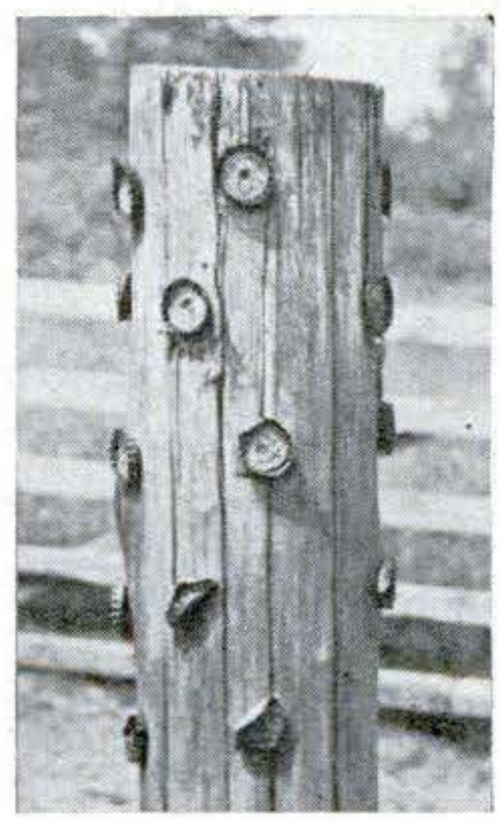
WHILE building a home, one person I know ran several lengths of plastic garden hose from the attic down through the wall to electric outlet boxes behind possible locations for a TV set. Now he is ready for practically any type of antenna that he might want to use in the future. The inside of the hose makes it easy to feed the antenna through the lead.—*B. C. Vaughan Jr., Springdale, Ark.*

Glue Helps Toughen Photograph-Mailers

CORRUGATED-BOARD stiffeners used to mail photographs won't become crushed and dog-eared if you first reinforce the corners like this.

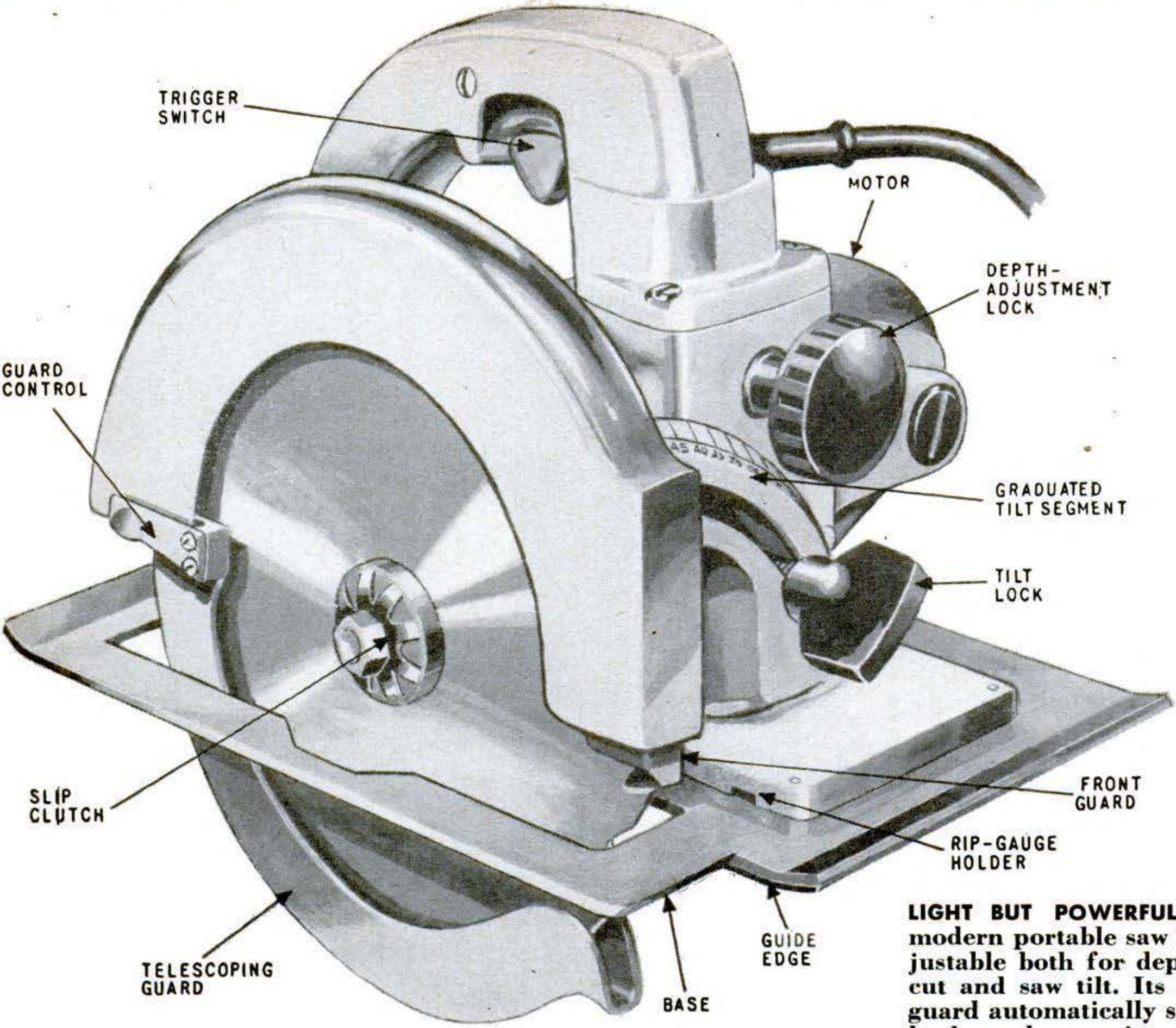
Dip them in liquid household glue, which has been slightly diluted with water and heated to increase its penetration qualities.—*O. A. Nelson, Seattle, Wash.*

Look! It's a Back-Scratcher



BOTTLE caps nailed to a stout post with their rough edges outward give cattle a place to scratch their itching backs on Walter Wiewal's dairy farm near Groton, Mass. He recommends using long roofing nails so the caps won't pull out. The caps are spaced 6″ apart.—*C. L. Stratton, Hollis, N.H.*

Copyrighted material



LIGHT BUT POWERFUL, the modern portable saw is adjustable both for depth of cut and saw tilt. Its blade guard automatically swings back as the saw is pushed against the work. The cord has a ground clamp in addition to the usual plug.

Facts and Pointers on Portable Electric Saws

Speedy and versatile, these tools go right along on the job, providing tireless energy for dozens of woodworking chores.

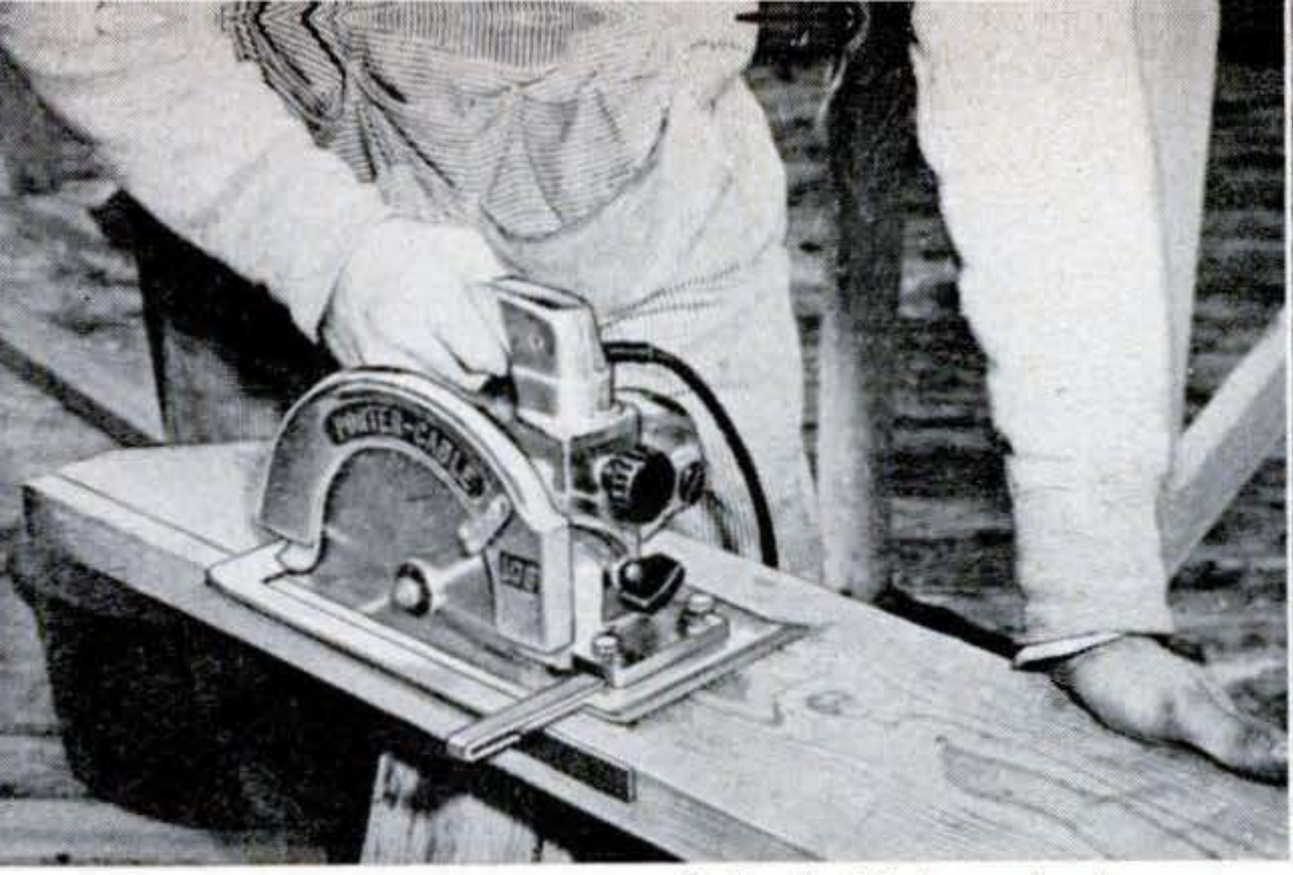
By Maurice H. Reid

From the book, How to Use Portable Power Tools
Copyright, 1954, by Maurice H. Reid
Reprinted by permission of Thomas Y. Crowell Co.

THE portable electric saw is a great time saver—one model will cut a one-by-ten plank in half a second. In cutting joists, studs and rafters, one man with a portable saw can easily do the work of 10. With a little practice, the average person can operate it with greater accuracy and ease than a skilled workman can use his handsaw.

Which saw do you need? The size is rated by the diameter of the circular blade, from the small 4″ up to the heavy-duty 10″ and 12″ blades used for construction work. The little 6″ saw will cut up to 2″ in depth. Since standard two-by-fours are 1¾″ thick, this saw will handle such pieces nicely. Its 45° bevel cut, however, will not quite reach through a two-by-four. For light framing, general house building and repairs, and for workshop use, the 7½″ or 8″ saw

Copyrighted material



A PLANK IS RIPPED while held lengthwise on a sawhorse, with the cutting line at the worker's right. His left hand holds the plank. The rip guide, set to the desired width from the right-hand edge, gauges the cut.

COMPOUND MITER CUTS slant two ways—the blade is tilted, and the cut is at less than 90° to the edge. Mark out the long side on top, for the saw tilts inward below. Guide it against a gauge (shown) or a clamped-on board.

will therefore be better suited to the job.

The drawing on the facing page shows the features of such a saw. A highly desirable feature is the kickproof clutch. A spring washer under the blade-retaining nut allows the blade to slip on the arbor if it binds in the cut, letting the motor turn even if the blade is locked.

This smooths out the drive action, relieving motor strain and lessening the risk of overloading. It also protects the user from possible kickback of the work.

How to use portable saws. The electric saw is a right-hand tool and is used much like the handsaw. But the cut is made from the near to the far edge and from the underside of the work toward the top. Hold the saw with the right hand and the work with the left. Make sure that the work is safely supported. The ideal height is about midway between knees and hips, or just below the hips. You should be able to move the saw the width of the board without stretching.

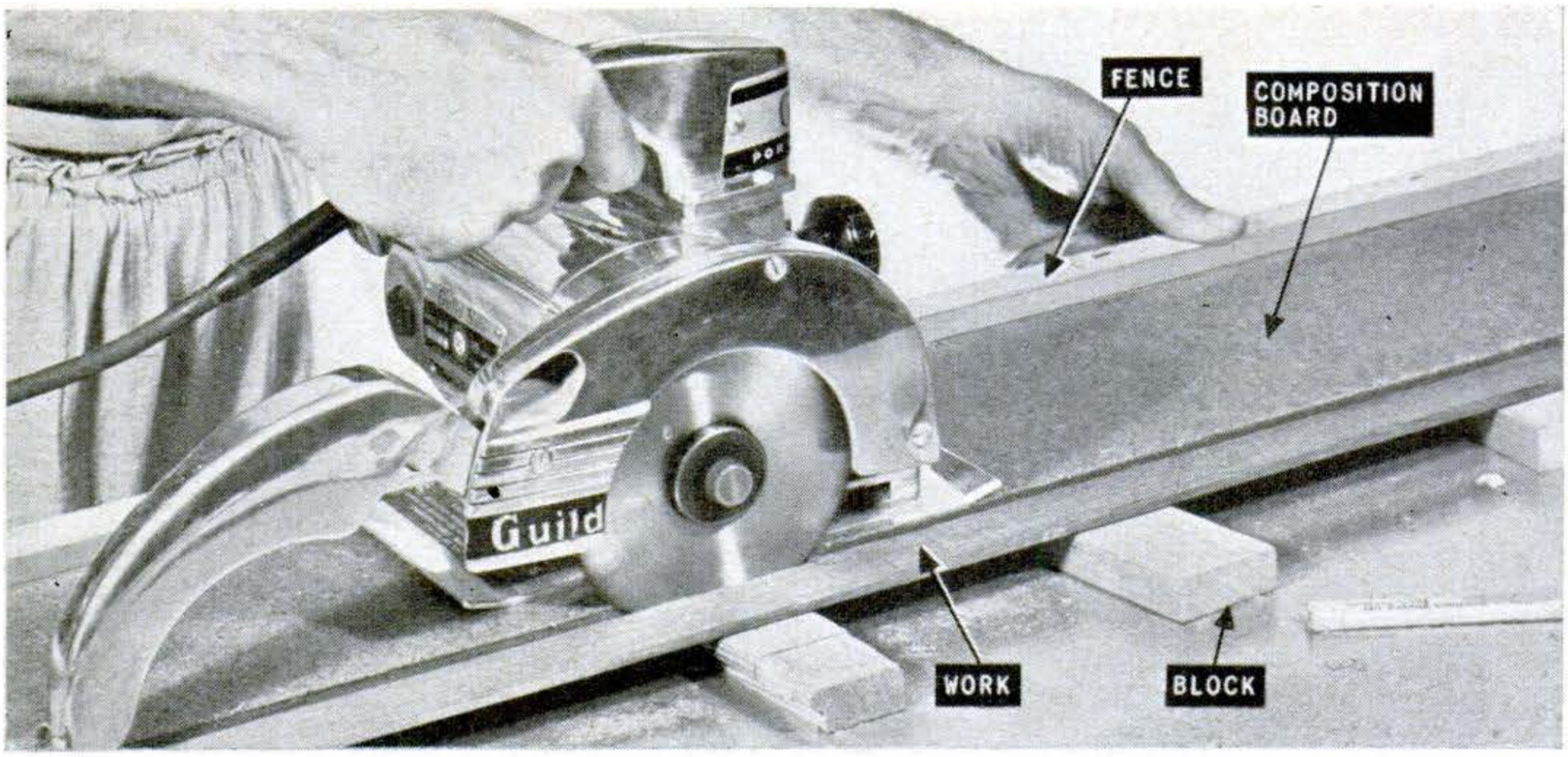
When working up to about 35 feet from the outlet, you can connect the machine cord to a floor outlet or an extension of No. 14 wire. For greater distances, use No. 12 or No. 10 wire connected at the fuse box. Inadequate wiring creates excessive voltage drop that can cause motor failure.

Be sure that the ground-wire clip on the motor cord is connected to a good ground on clean metal. This can be a water pipe, electrical conduit or BX cable, or a pipe or rod driven into the ground. [Such grounding is your best protection against possible shock.—Ed.] Keep the inlet and outlet air passages on the saw free of sawdust to keep the machine running cool.

Sawhorses make good work supports and

TO MAKE POCKET CUTS inside a floor or wall, set the saw down near one corner with the front of its base on the wood, the guard held back and the blade on the waste side of the line. With the blade raised slightly, start the motor and lower the saw into the wood until it is down flat. Back up to the near corner first; then cut forward to the opposite one. Repeat for each side. Since the round blade cannot cut the corners out square, finish them with a keyhole saw or handsaw.

Copyrighted material



A PRECISE RIPPING GUIDE for long work consists of a piece of composition board with a wood strip nailed along one edge. The left edge of the saw base guides along the strip. As the first saw pass cuts the right-hand edge of the composition board, this edge can thereafter be used to set guide on the rip line. Blocks under work prevent cutting into table.

are about the right height. Place them far enough apart so that the material rests solidly without tilting, and with one of the horses close to the left of the line of cut. Be careful to leave clearance for the blade to cut without sawing the support.

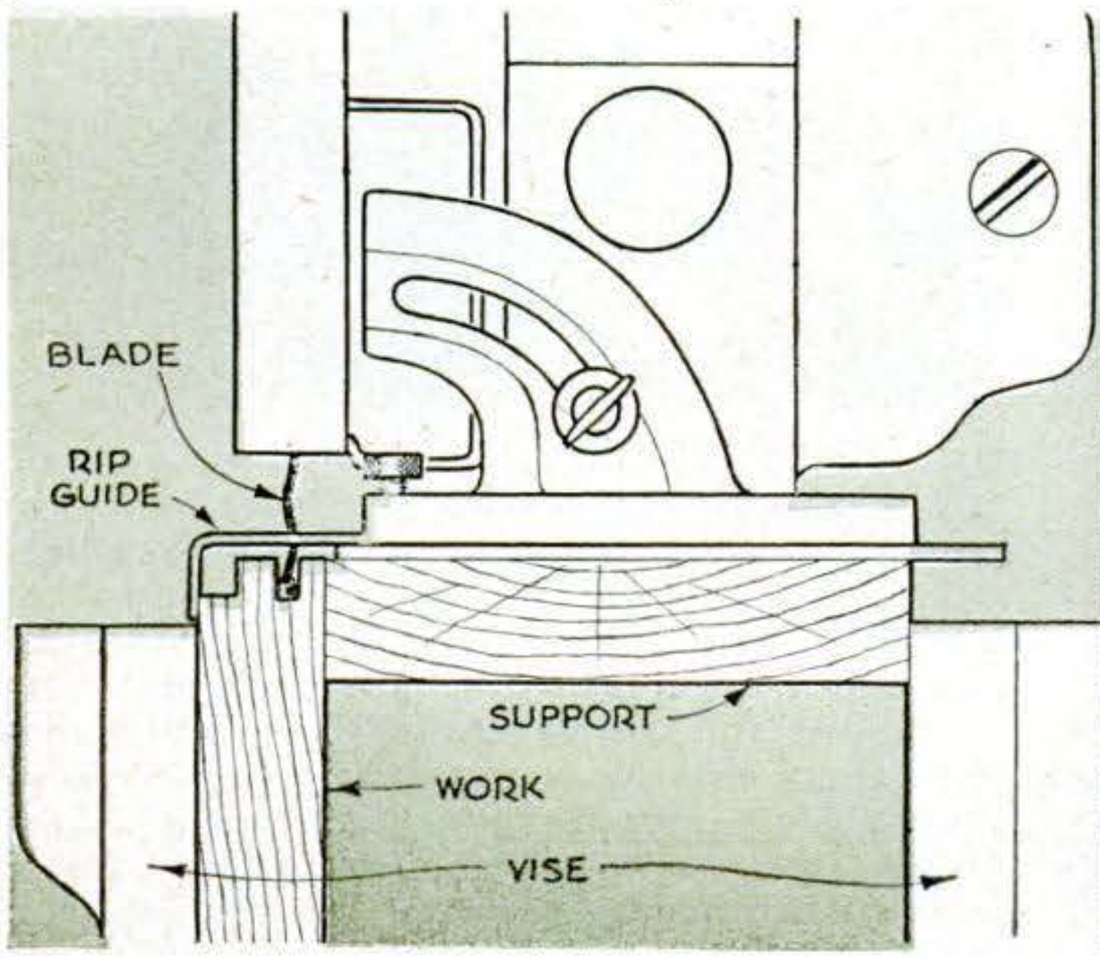
When plywood or other light material is sawed, place the stock on a table with scraps of one-by-two under it, spacing these so that the work does not sag. Set the blade depth to cut just through the material.

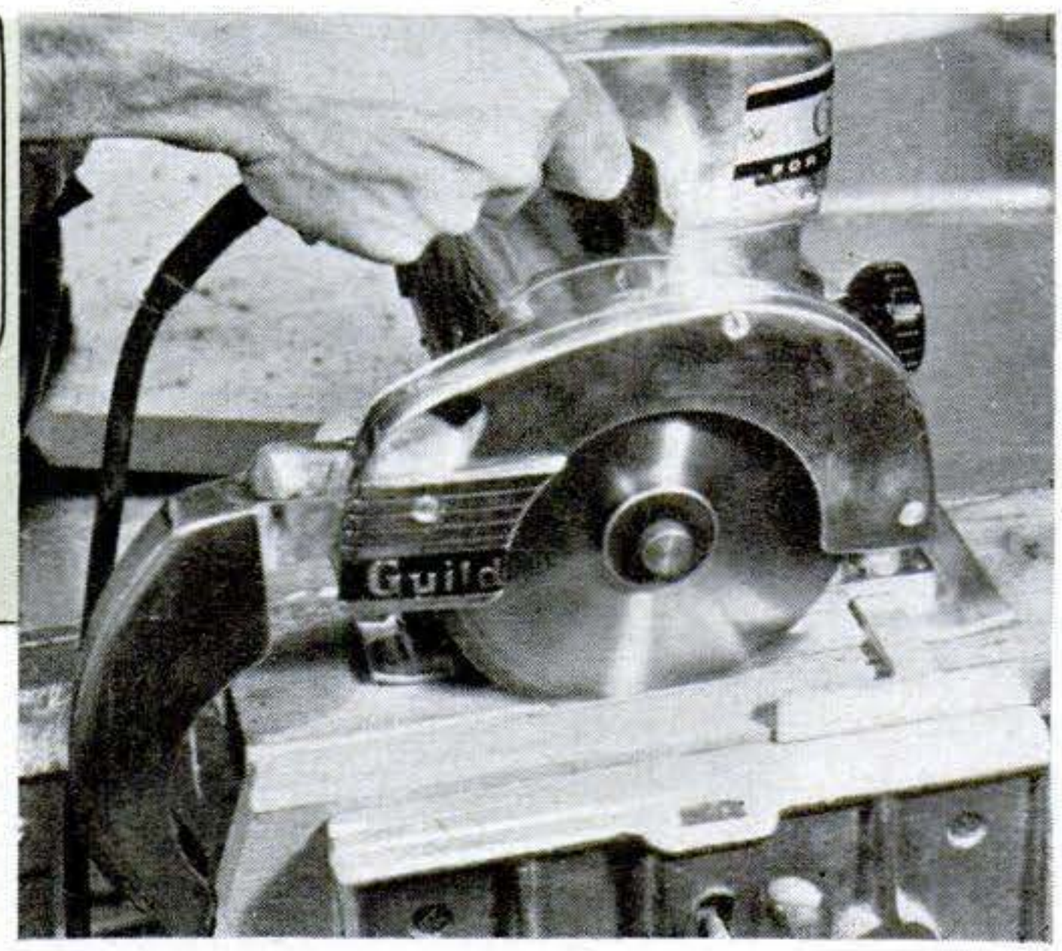
Crosscutting operations. Crosscutting can be done with the combination blade for ordinary work, with a crosscut blade for a cleaner cut, or with a planer blade if a really smooth edge is desired. Be sure the blade is sharp, and set the depth so that it cuts just through the work.

Whenever possible, place the board to be cut so that the mark is at the right of the support. Lay out the work so that the base plate of the saw will ride on the supported side of the material. Rest the front of the saw base on the work, the cutting line aligned with the guiding edge of the base. With the blade well back of the work, start the motor and let the blade come up to full speed.

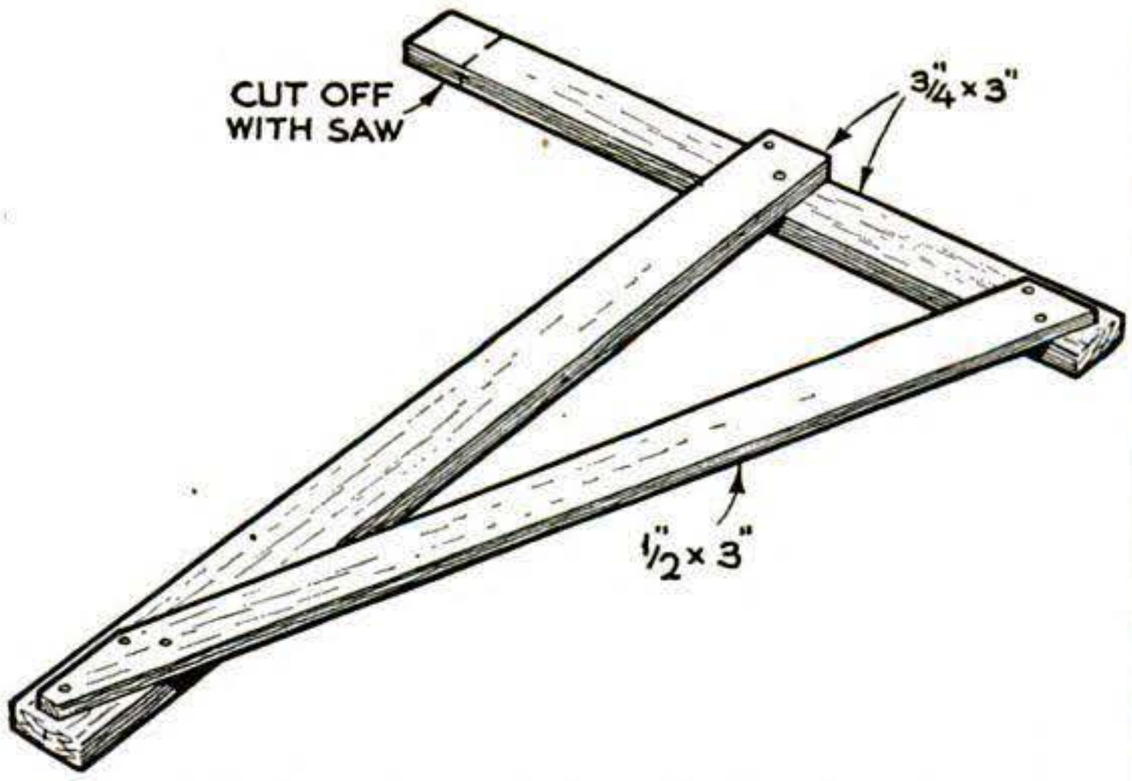
Advance the saw steadily, following the cutting mark with the edge of the base plate. At the end of the cut, release the trigger switch and follow straight through

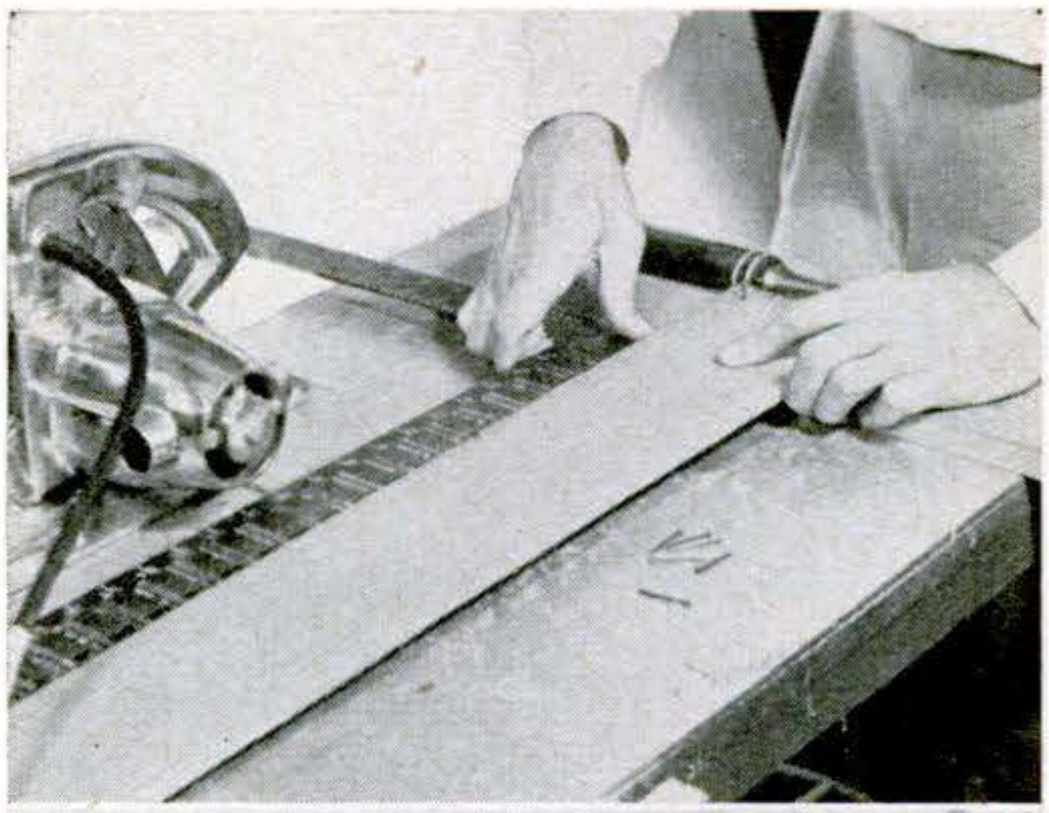
EDGE CUTS for rabbets, tongues or grooves require an extra board clamped in the vise alongside the work, exactly flush with it, to support the saw. The rip guide gauges the cut.

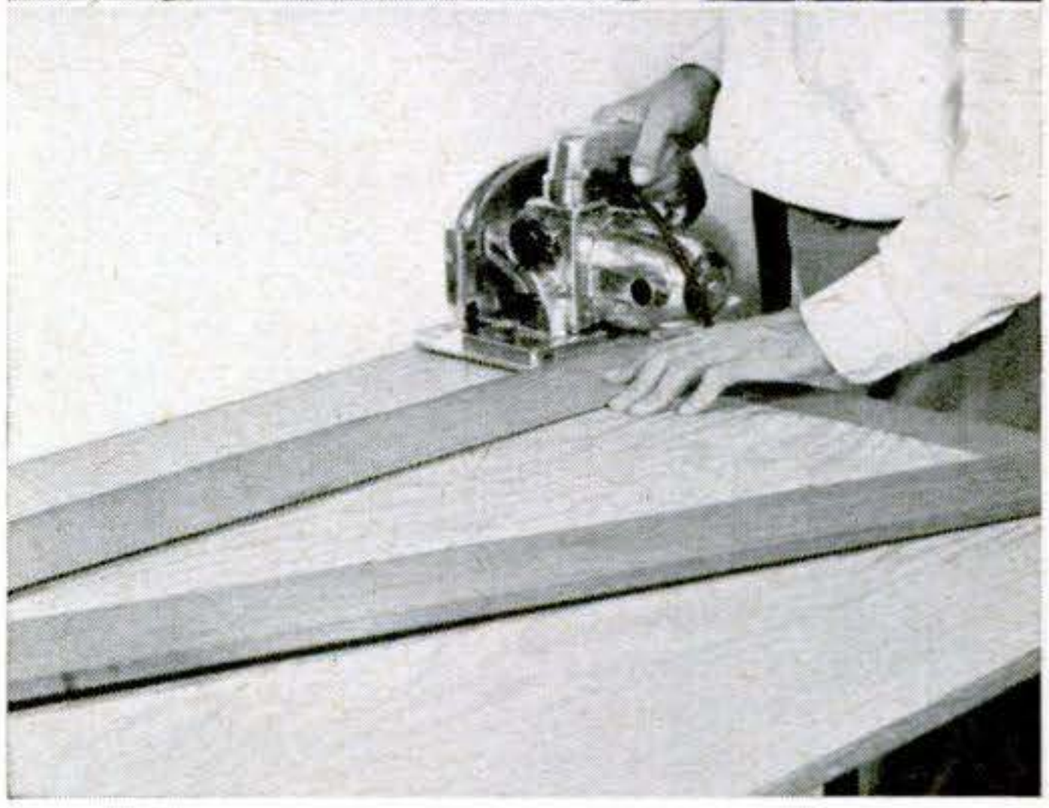




Copyrighted material







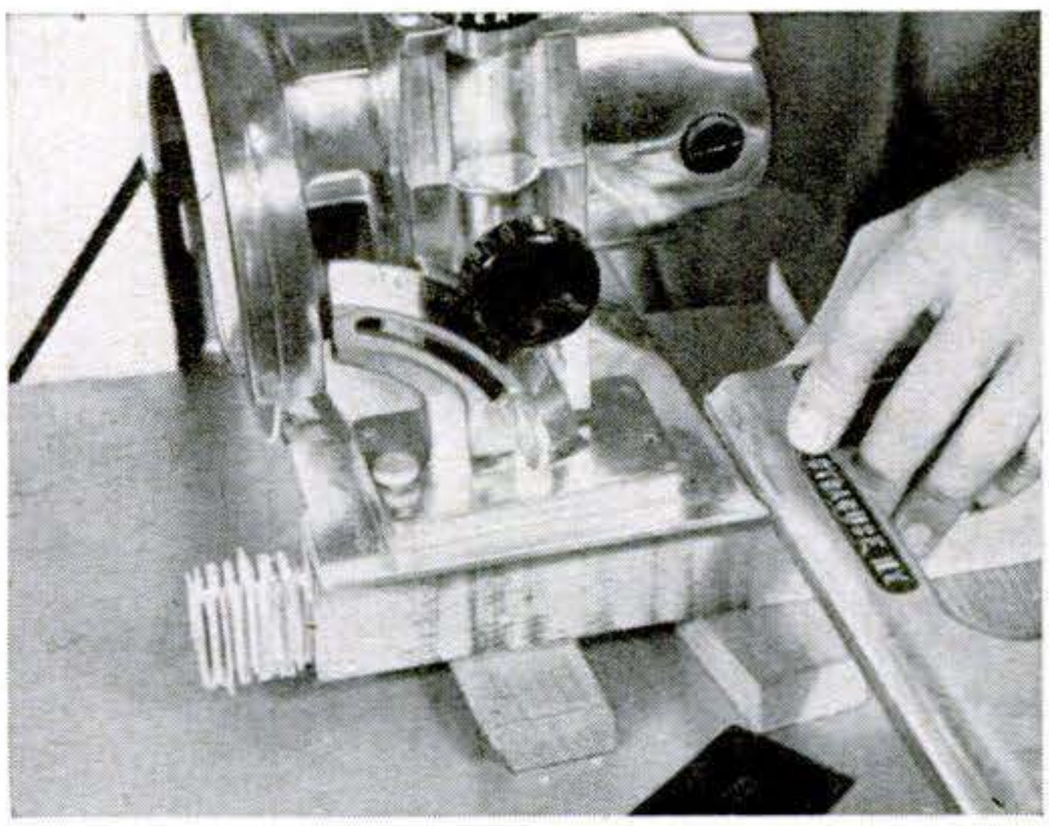
A BIG SQUARE for cutting plywood and wallboard accurately can be made from a 6′ length of one-by-three with a smooth, straight edge. Use a framing square as in the top photo at right to nail it at 90° to a base piece that extends past it about a foot. Brace with a light strip; then saw off the base as in the lower photo. Set end where work is to be cut.

until the blade is clear. Then lift the machine out and away from the work. Do not let the blade keep running or twist the saw at the end of the cut, or the work may be scored. To prevent jamming or binding of the blade as you reach the center of a wide board, insert a screwdriver or small wedge at the starting end of the kerf.

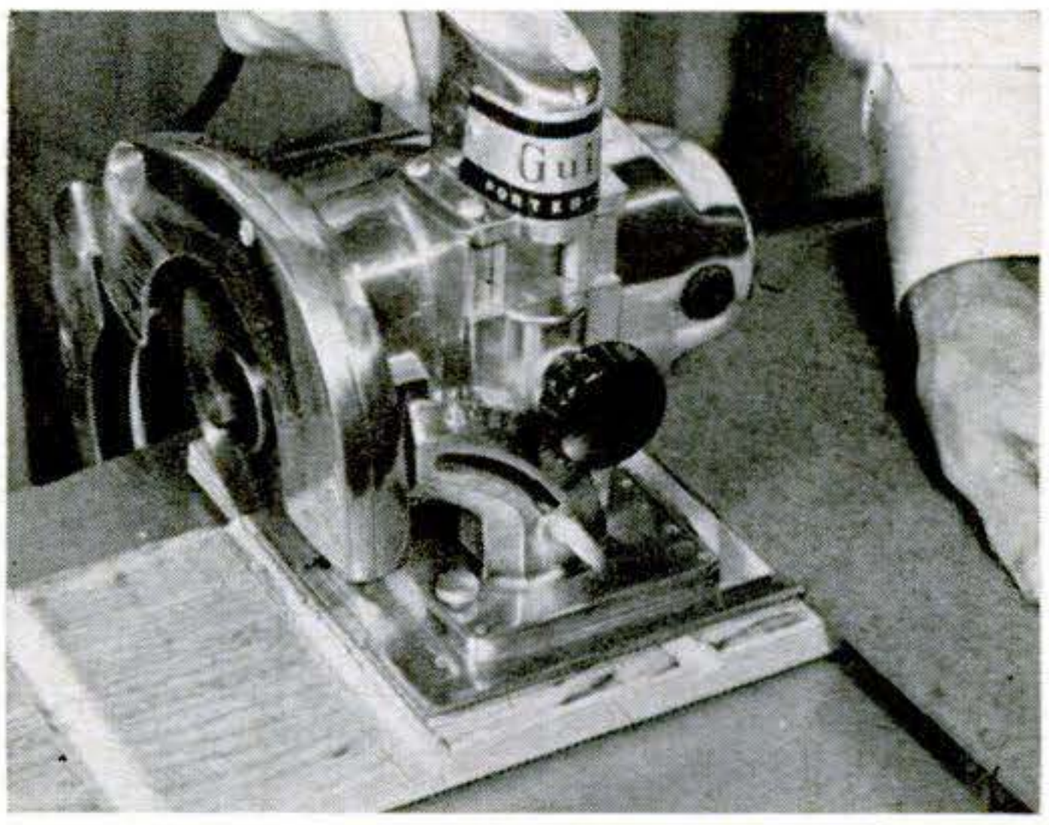
Freehand cutting is quite easy and can be very accurate. Let the saw balance itself in the hand. Get to know the feel required to keep the blade cutting. Never push or force it into the work. Let the saw do the cutting, while you merely guide it.

Ripsawing. Ripping can be done with the combination blade or the ripping blade. The latter will give a smoother edge. Adjust the blade depth slightly more than for crosscutting. Then attach the rip gauge and set it at the required distance to the blade.

Generally, a slightly different arrangement for holding the work will be needed in ripping. One must be careful not to cut toward the sawhorse or other support. Ripping a wide board presents few difficulties because there is ample support for the saw and a good hold for the left hand. Run the

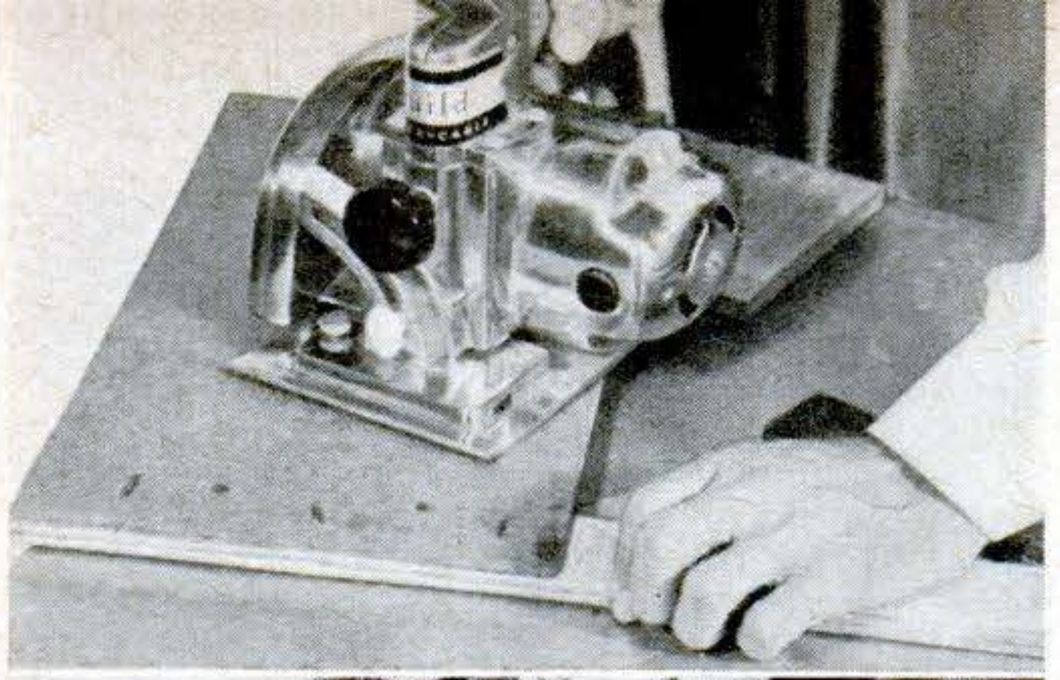


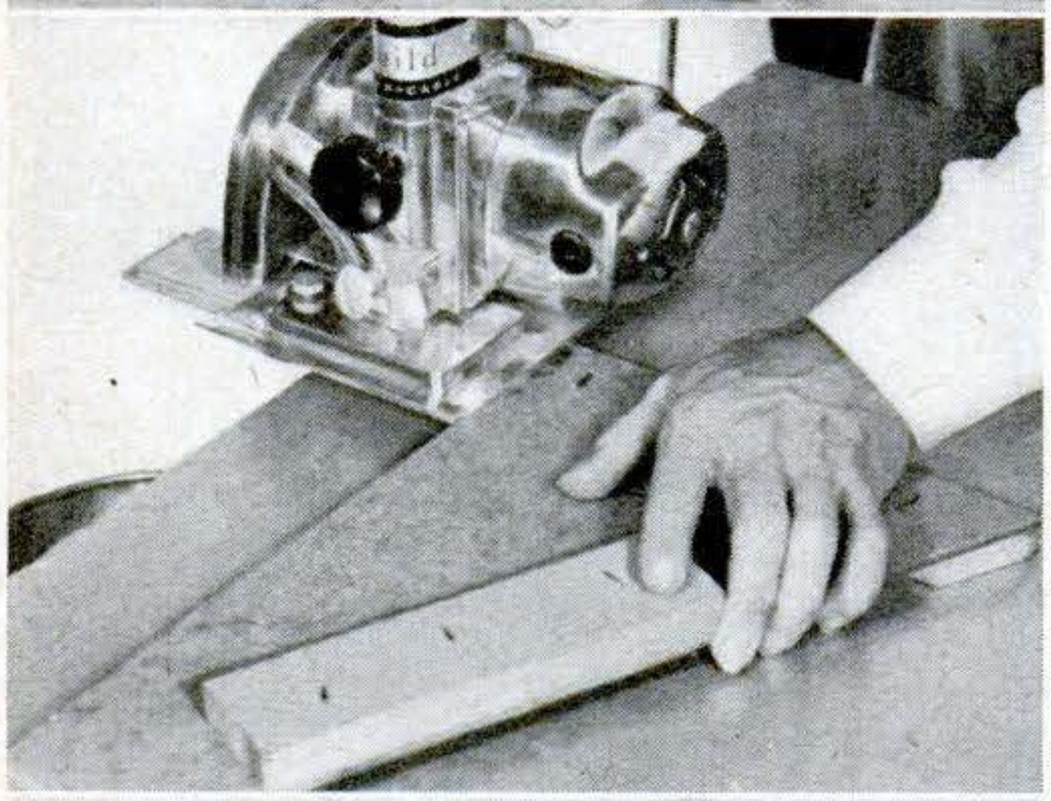
TENONS ARE CUT with repeated passes like this. Make the shoulder cuts at the bottom of the tenon first, guiding against a square. Then cut kerfs to the end, leaving a little wood between them. Pare ridges with a chisel.

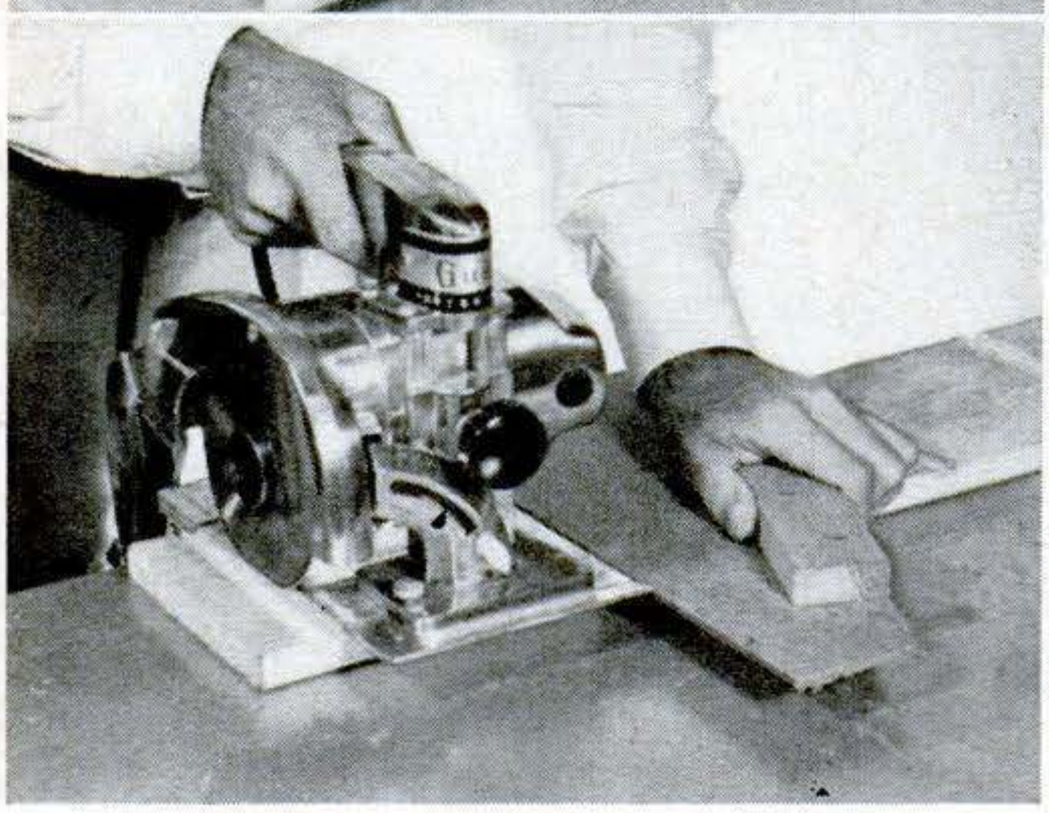


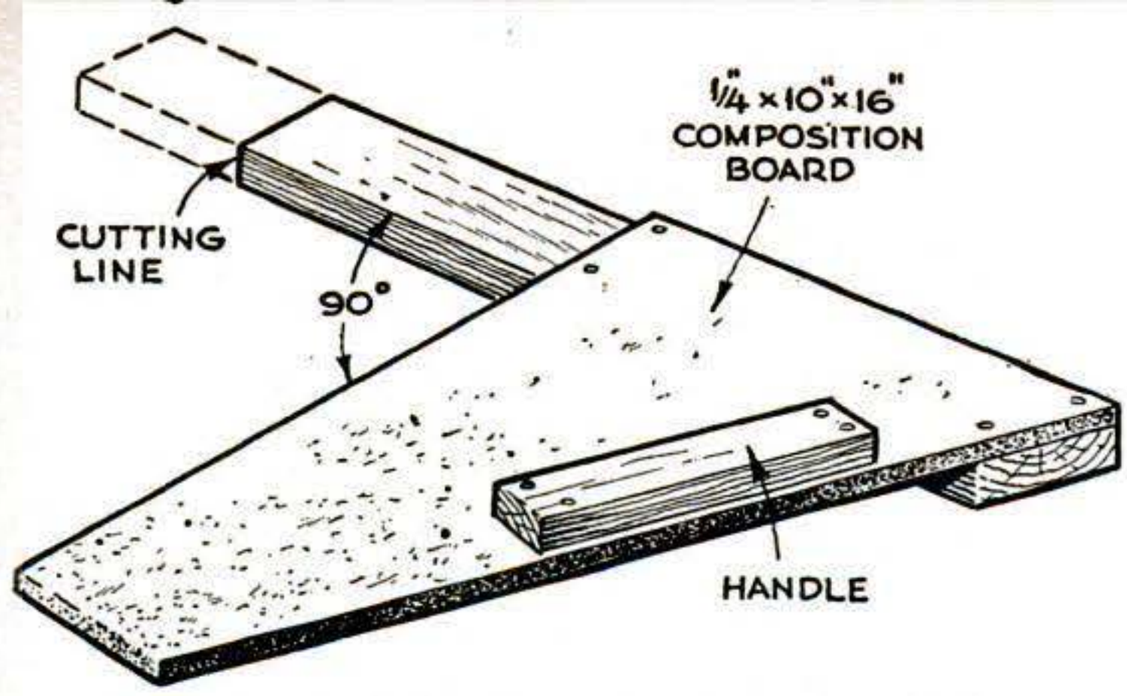
FOR DADOES, use a square or a clamped straightedge. Cut to the dado lines first. Remove waste with repeated passes, leaving 1/16″ of wood between them. Chisel out the rest. Smooth with sandpaper-wrapped block.

Copyrighted material









HANDY CUTOFF SQUARE is made by nailing a length of wood to a piece of composition board. Saw outside to an angle as in top photo, nail on a short piece as a handle and cut projecting part of base off as in center photo. Align cut end with mark on work.

cut out to the limit of a reasonable reach. Release the trigger, but be careful that the saw is not moved. Then slide the board toward you so that the cut can be extended farther, and insert a small wedge in the cut to hold it open.

Of particular importance in ripsawing is the width of the cut made by the blade. The blade will remove material to a width about twice its own thickness. This loss of material can be disastrous if the cut should be made on the wrong side of the line; the resulting piece of lumber would be narrow by 3/16". When ripping a piece of wood, be sure that the cut is on the waste side.

Bevel sawing. The depth of cut possible with the saw tilted at an angle is not as great as with a straight cut. When working at near-capacity limits, check the thickness first to make sure that the cut can be made in one pass. If it cannot, it may be best to decrease the depth so that about half the necessary depth is cut on the first pass. Then you can turn the piece over and complete the cut with a second pass. Leave the saw set at the same angle, but guide on the other side of the mark so that the two kerfs will be lined up.

Bevel cutting is sometimes confused with mitering, which is actually an ordinary, straight-blade cut made at 45° across the board. More care must be taken in starting the blade in this cut, and the work must be held securely in place. A bevel cut made at an angle to the board edge is called a compound miter cut. Set the saw blade at the necessary angle and mark the long side of the bevel across the surface of the wood. It is a good plan to make a trial cut with a piece of scrap first.

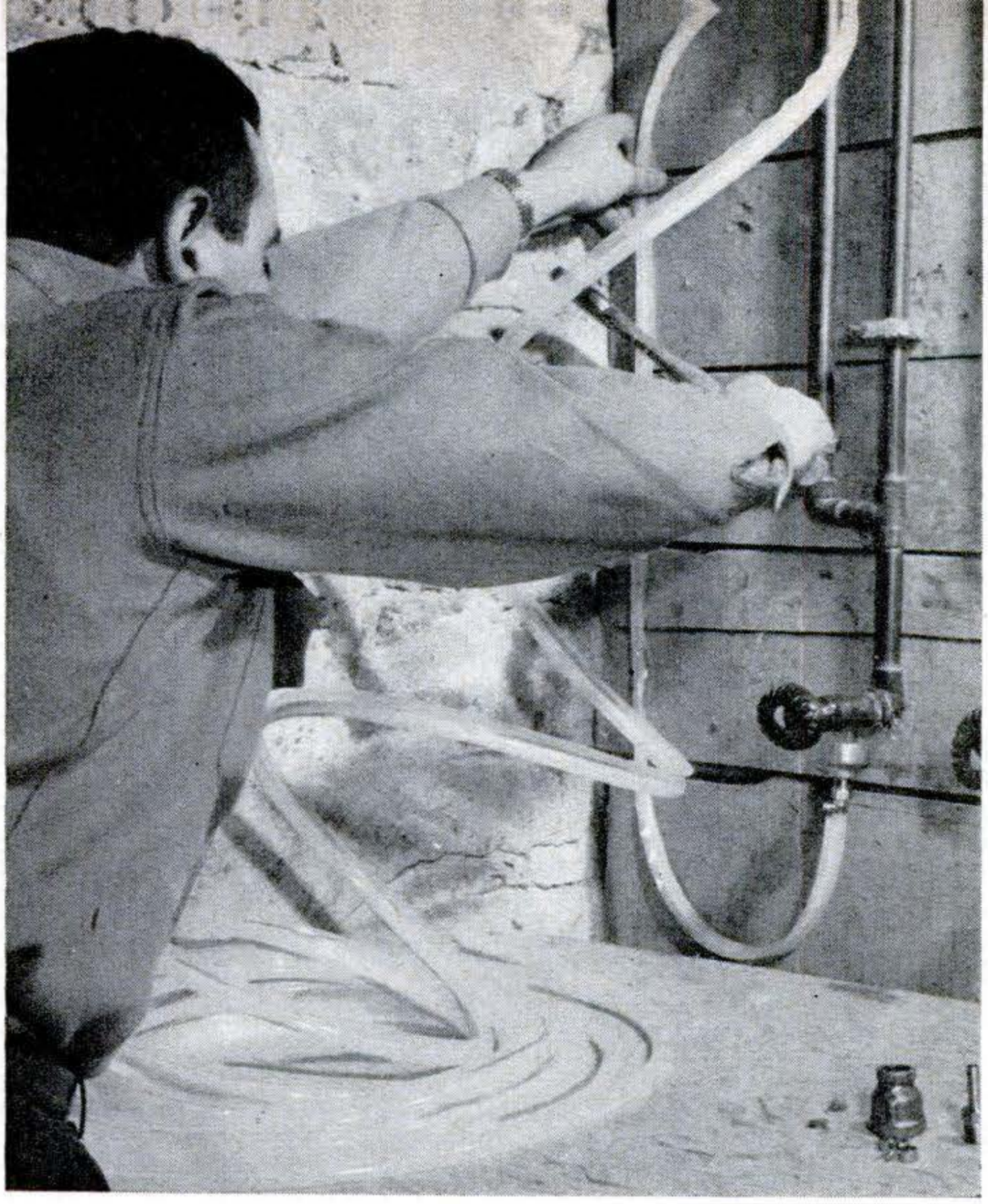
Rabbeting and grooving cuts. These are made like cross and rip cuts, except that the depth adjustment is set to the desired depth of the rabbet or groove. Several passes may be necessary for wide grooves, but should offer no problem if the cuts at the edges are accurately guided. The second, or edge, cut of a rabbet will require another piece for supporting the saw, as shown in one photo.

Making saw guides. When you are first learning to use the saw, it will help to have a cutoff square. One type is made of aluminum alloy. You can make wooden ones yourself as shown in some of the accompanying photos.

When working with guides, you will find that the wider blades, such as the combination, will saw just a bit short if the guide was made for another blade. Check the exact distance from the guide to the kerf, especially when cutting for joints. END

Copyrighted material

New for the Handy Man

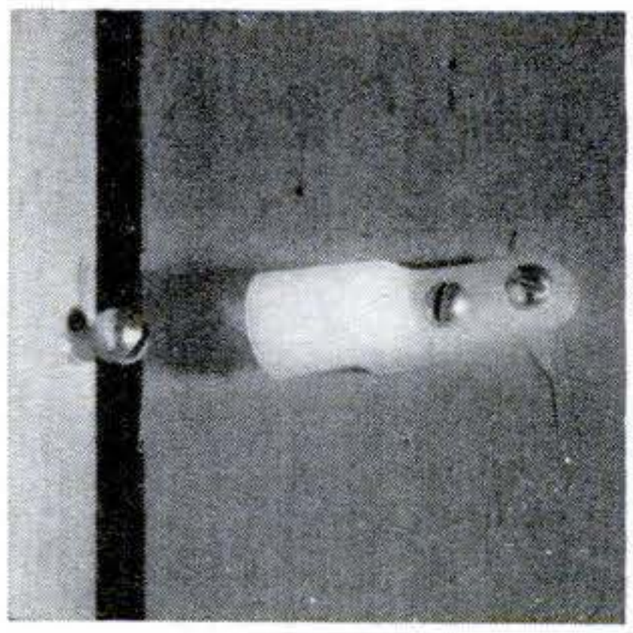


1. Plastic Plumbing Nails to Wall. A flange along the edge of this flexible-plastic tubing lets you nail it directly to walls or woodwork for easy piping of water throughout a house. With the tubing, you can feed a darkroom, hook up cellar and attic sinks, connect refrigerator and dehumidifier drains, and make other semipermanent cold-water hookups. It comes in 50′ lengths with one coupling for attaching to standard ½″ pipe thread and another for ¾″ garden-hose thread. Two types, for indoor and outdoor use, are available.

2. Trowel and Claw Speed Gardening. This double-ended aluminum tool (below) will dig or rake, letting you do most small garden chores with one implement. The claw end can also be used to tamp down soil.

3. Glass Membrane Seals Roof Leaks. Narrow strips of glass-fiber cloth make it easy to patch gutters (below), cracks around flashing, and other roof leaks.

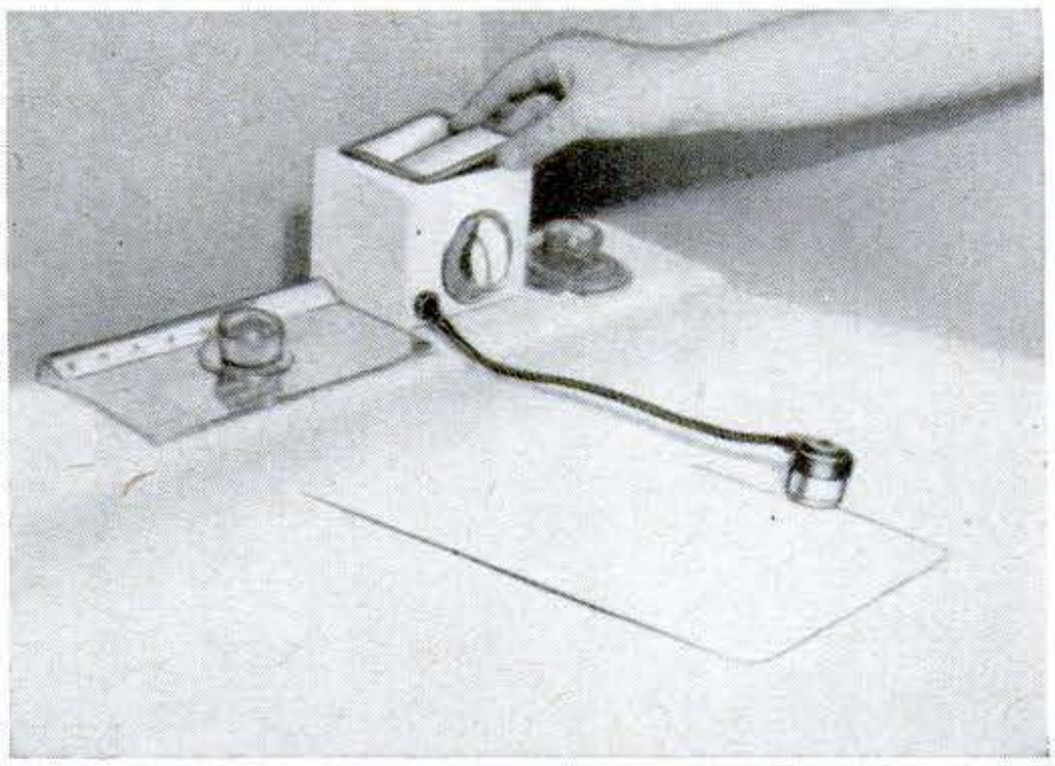
The cloth is placed over the crack and covered with a thick coat of roofing cement, creating a strong, permanent, waterproof patch. It comes precut in narrow ribbons, ready for use.



4. Plastic Catch Is Noiseless. Screw this small plastic barrel to a cabinet and the ball-headed screw to the door, and you have a quickly mounted catch that closes silently and stays tightly shut by friction. The flexible plastic adapts to warped surfaces and slight misalignments of the two parts.

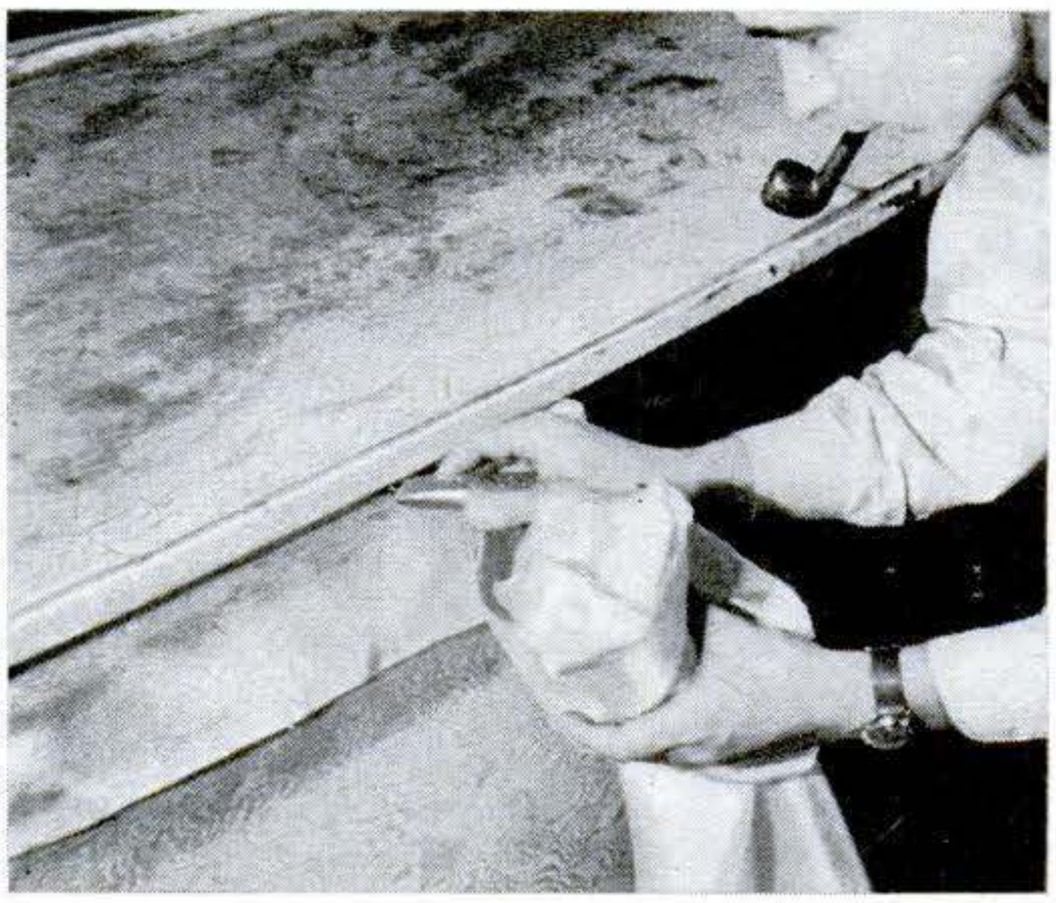
Please turn the page for more handy-man news.

New for the Handy Man
(Continued)



5. Drier Fits Clothes Washer. This heater-blower attachment quickly converts any tumbler-type washing machine into an automatic drier. The circular unit (at left) fits in place of the glass window. To keep water out of the blower during washing, a gasket seal must be lifted out of the timer (above) and placed over the opening before the machine will operate. A moisture-sensitive control shuts off the blower when the clothes have dried.

6. Wall Design Rolls On. You can put a wallpaperlike design on any painted wall with the patterned paint roller below. It has a self-feeding one-pint tank, can be used with oil, rubber and other paints, and comes in 32 different designs. When one application is dry, a second or third color can be rolled on top.

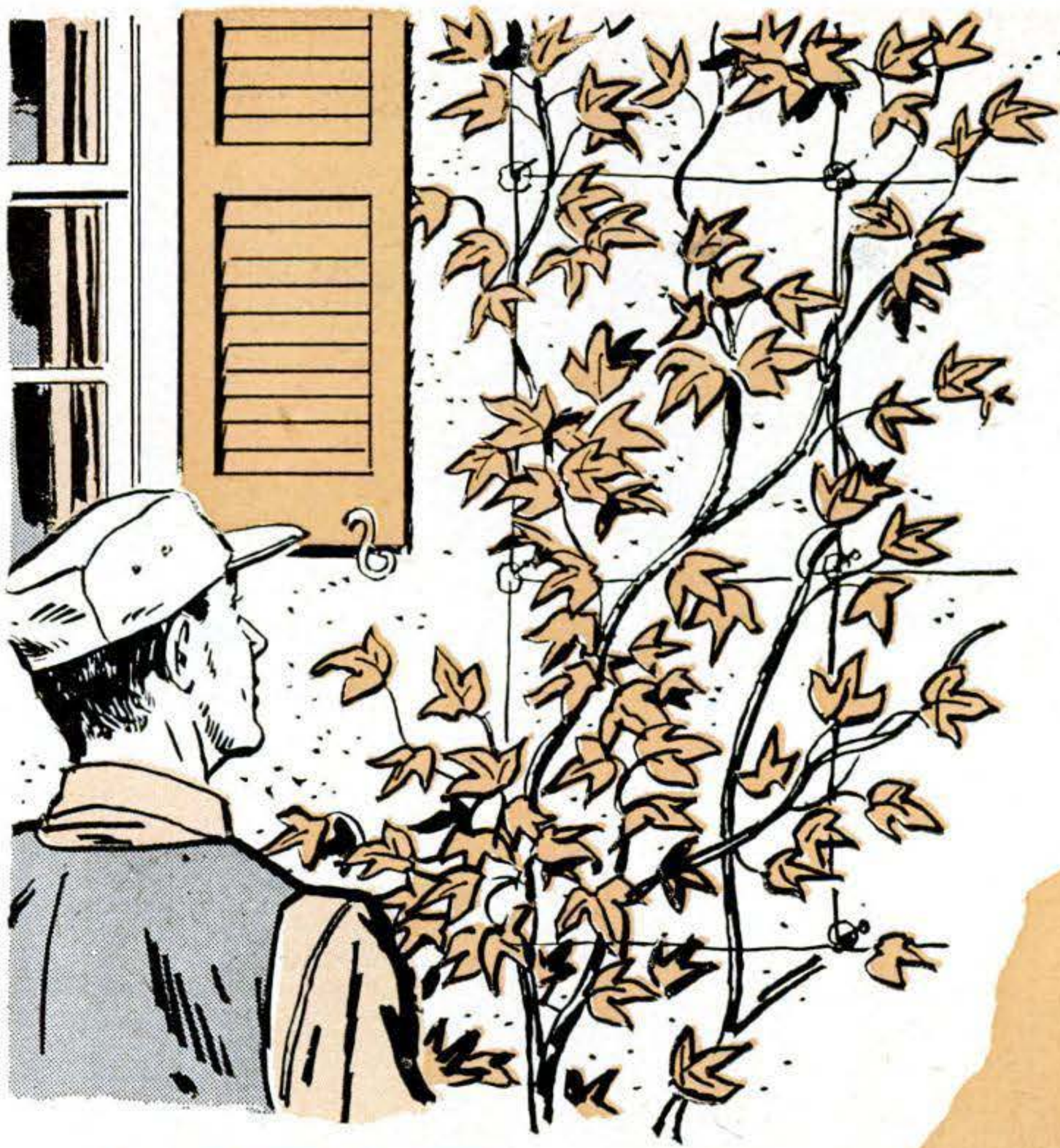


7. Glass Cloth Covers Boat. You can put a complete new waterproof covering on a boat hull with the glass-fiber cloth above. The cloth is cemented to the hull's contours, then coated with a resin that produces a tough plastic finish. Excess material is then trimmed off, and the boat is ready for use. The finish can be precolored by adding chemicals to the resin.

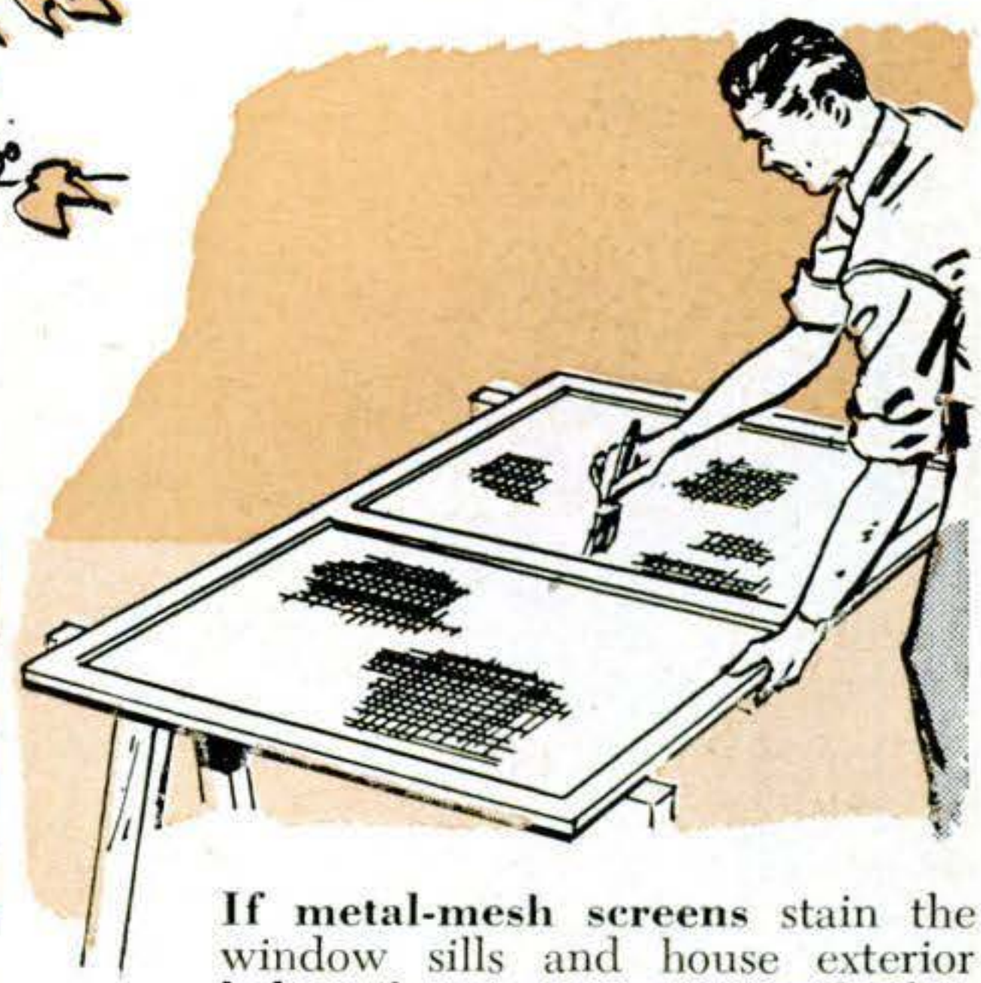
Further information on the products described on this and the preceding page can be obtained from: 1. Nail-A-Tube Co., 36-37 35th St., L.I.C., N.Y.; 2. Canton Mfg. Co., 2408 13th St., N.E., Canton, Ohio; 3. Gibson-Homans Co., 2366 Woodhill Rd., Cleveland; 4. Washington Steel Products, Inc., 1950 E. 11th St., Tacoma, Wash; 5. Turo Dryer Corp., 3 Washington Place, NYC; 6. Motifs, Inc., 166 Beechnut St., Fond du Lac, Wis.; 7. Glass Plastics Supply Co., 333 W. Elizabeth Ave., Linden, N.J.

Copyrighted material

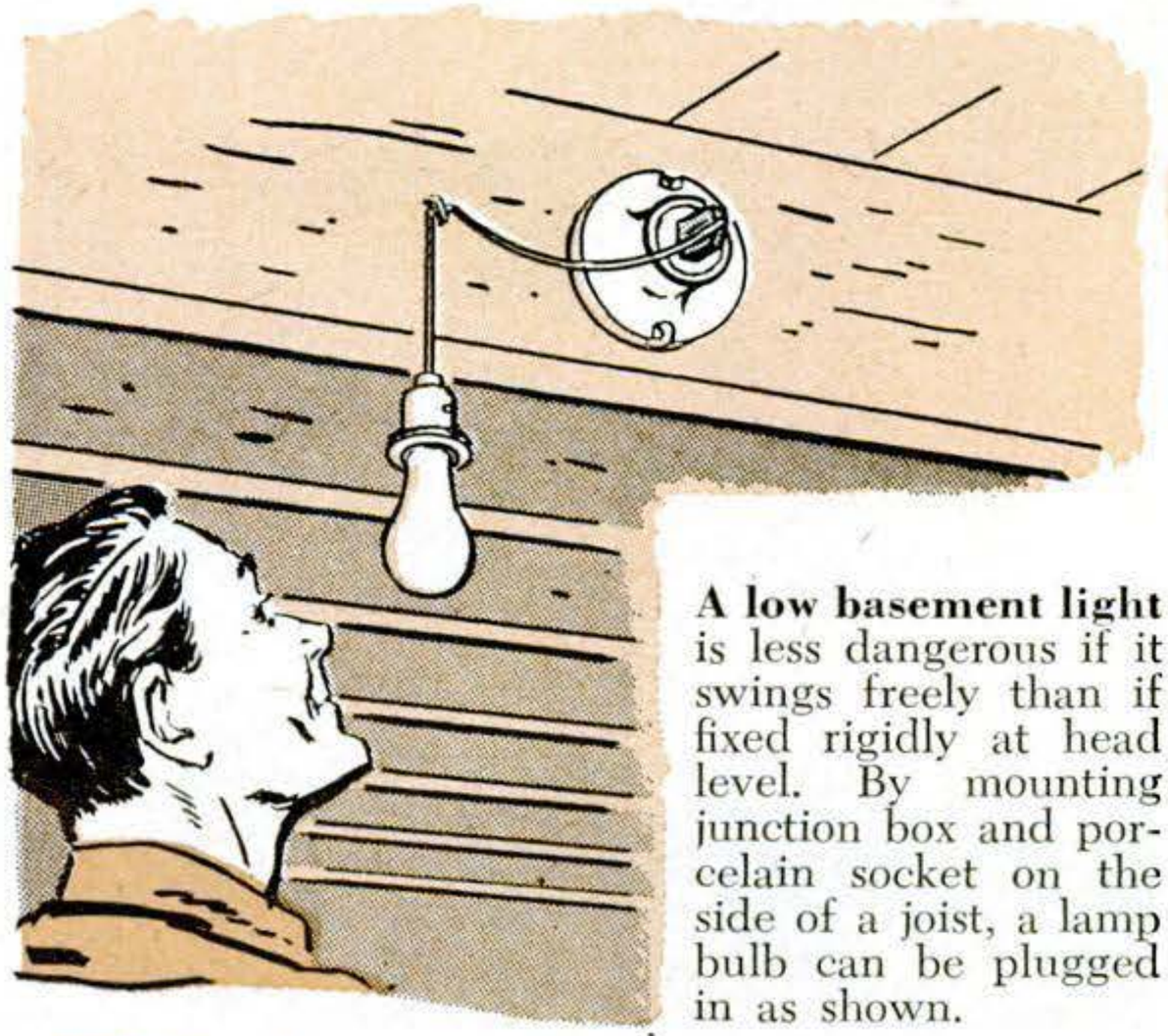
KEEPING THE *Home* SHIPSHAPE



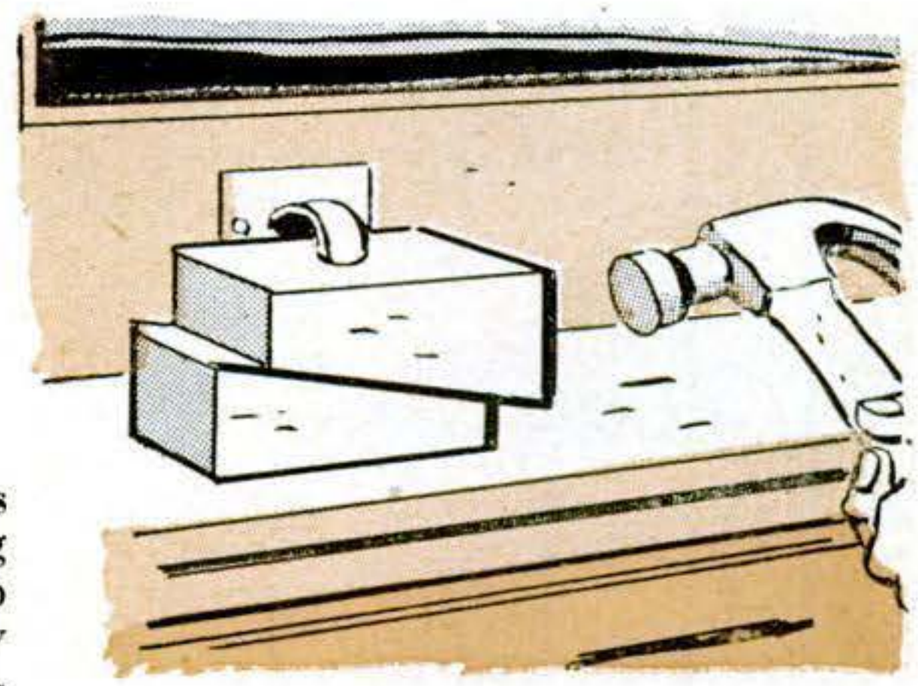
To support a vine climbing up stone, brick or stucco, press blobs of plastic-composition wood to the wall. When these have dried, staples can be driven in to hold guide wires or strings.



If metal-mesh screens stain the window sills and house exterior below them, you can stop further discoloration by coating the mesh with a two-to-one mixture of boiled linseed oil and turpentine.



A low basement light is less dangerous if it swings freely than if fixed rigidly at head level. By mounting junction box and porcelain socket on the side of a joist, a lamp bulb can be plugged in as shown.



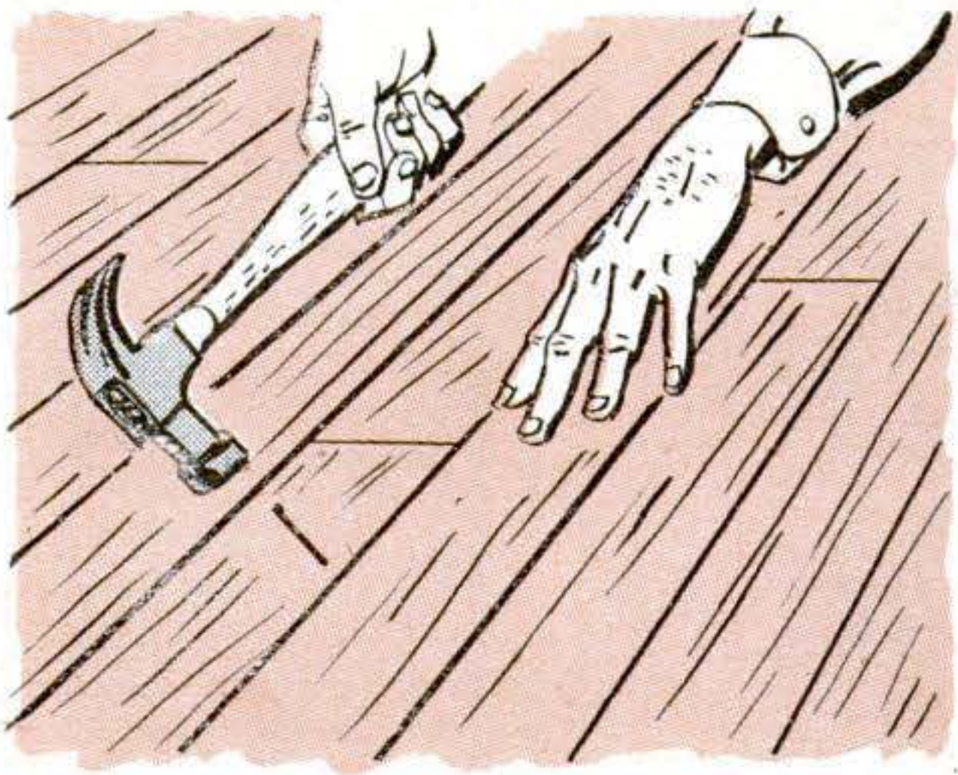
A stuck window that has finger grips at the sill can often be pried open with two wood wedges. Wax the meeting sides of the blocks so the upper one will slide easily when tapped with the hammer.

Painting radiators with a bottle-cleaning brush makes the job go faster. The narrow head on the long handle fits easily between the leaves and into hard-to-reach spots. Use a flat wall paint of a light color for the most efficient heat radiation.

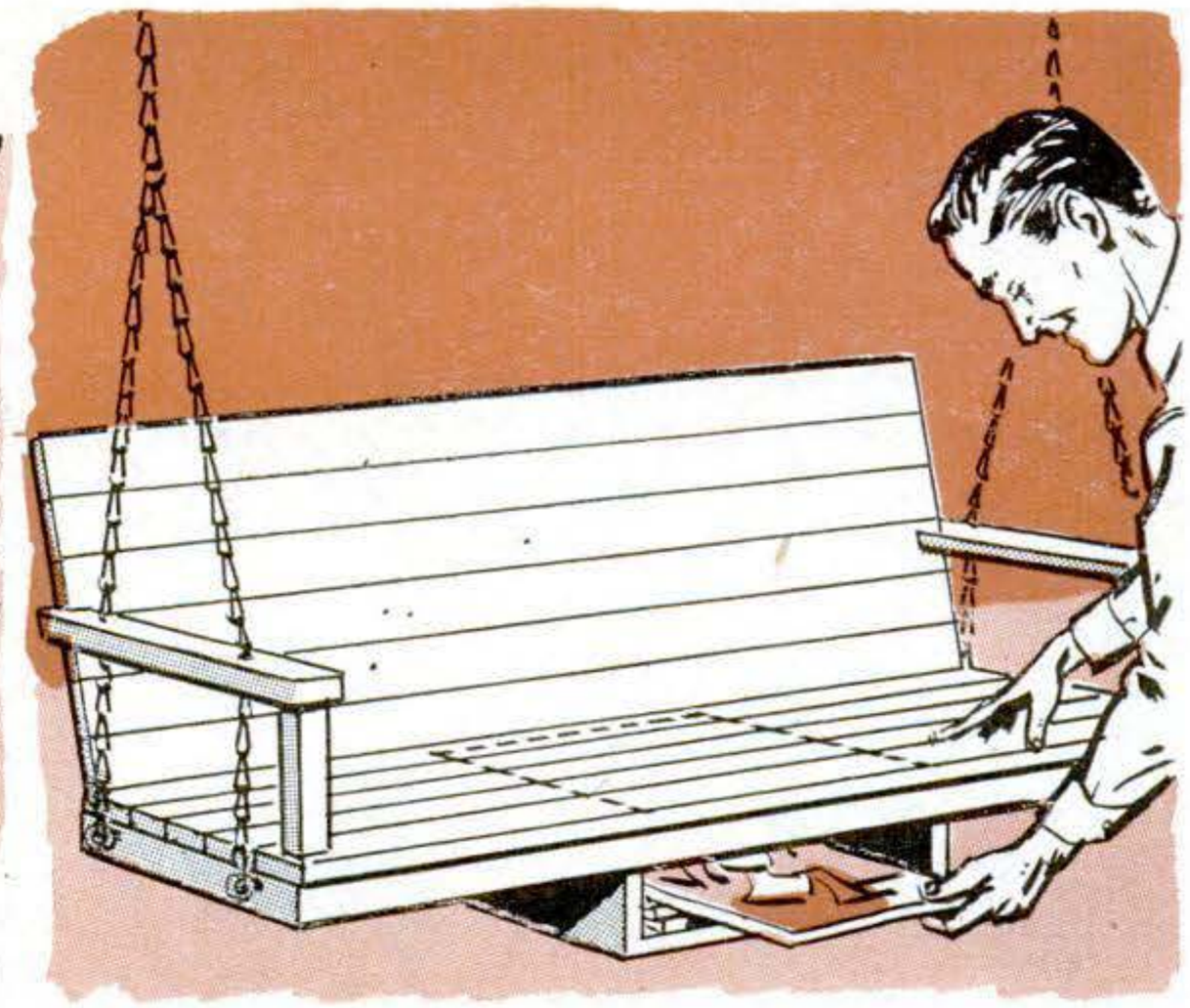
Please turn the page for more home tips.

Copyrighted material

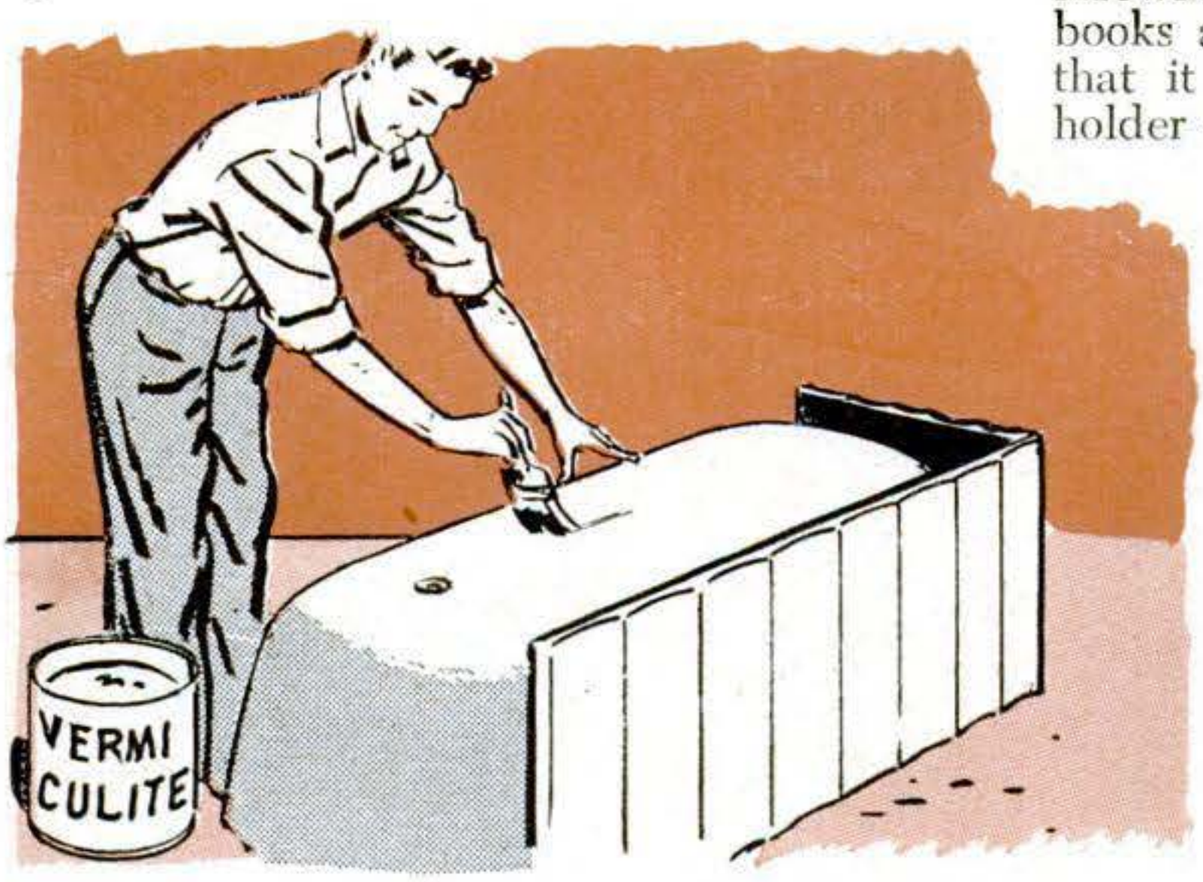
More Home Tips



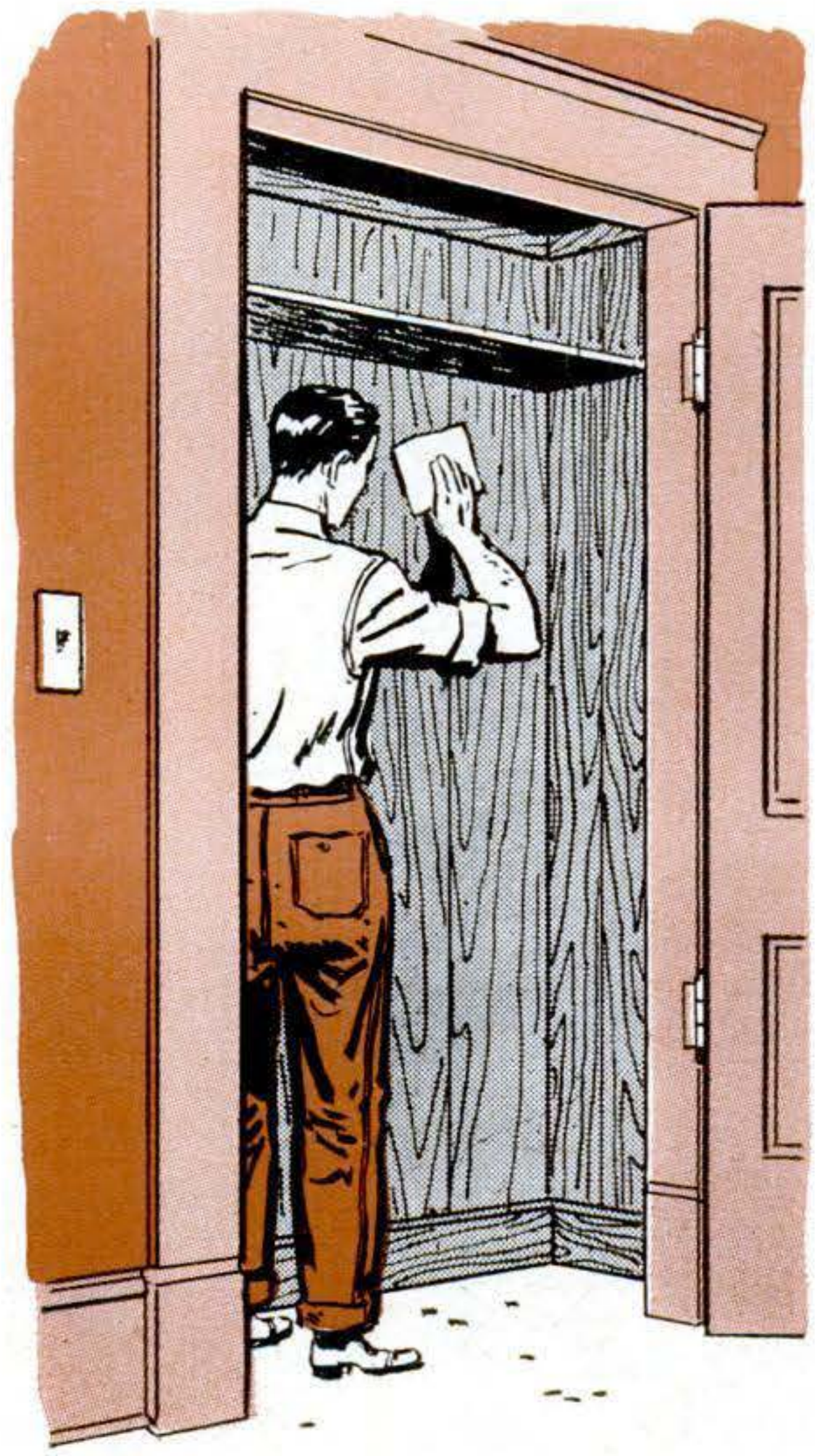
Get rid of floor squeaks by driving 2" nails into the boards at an angle, close to the edges. Use a nail set to sink the heads, then fill with plastic-composition wood or putty. Sand and finish.



An uncluttered swing will invite use when you have an idle hour to spend. Keep the seat clear by screwing an open-ended box underneath it to hold books and magazines. Paint or varnish the box so that it matches the swing. Attach the magazine holder to the seat with flathead screws.



Before installing a bathtub of rolled steel, insulate bottom and sides with a mix of cement and vermiculite and bath water will stay hot longer.



Cedar-lined closets and cedar chests will have a more deadly effect on moth larvae if they are lightly sanded about once each year. The sanding reopens closed pores in the wood, renewing the pungent quality of the cedarwood oil.

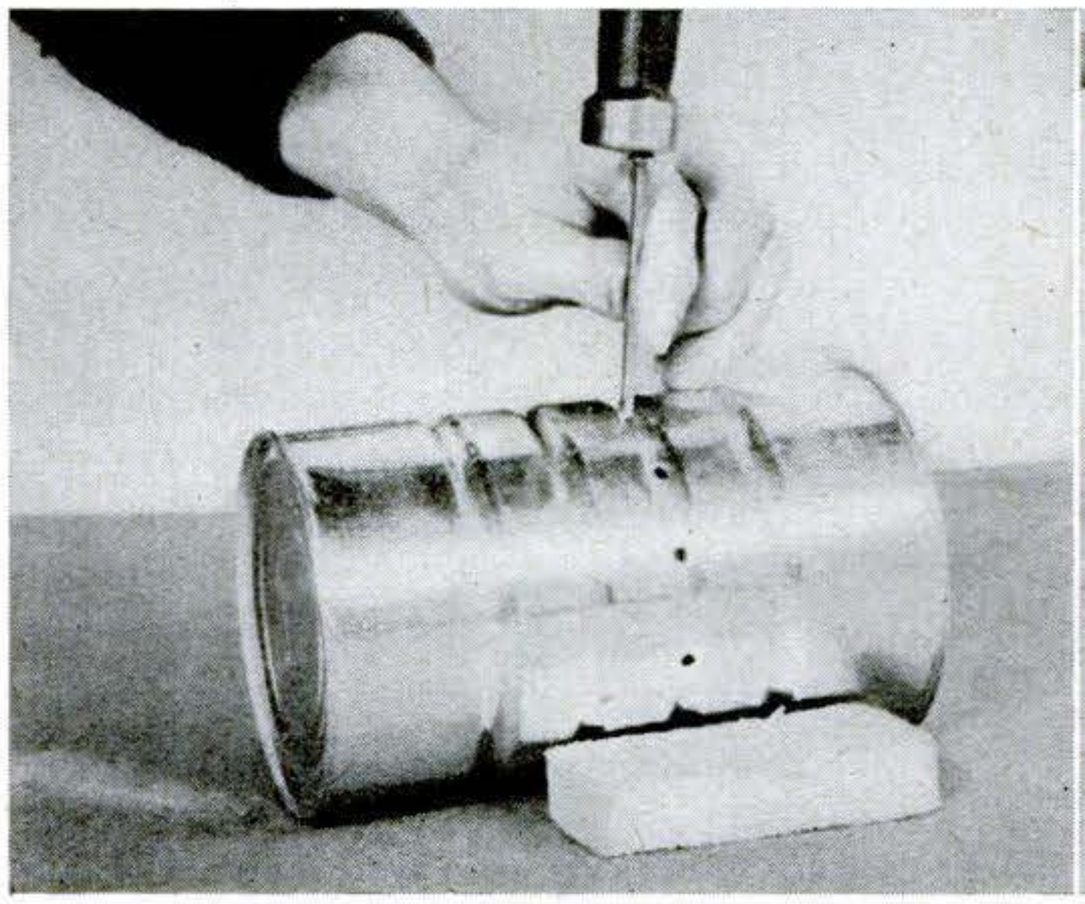
A drinking fountain outdoors will keep your youngsters and the neighborhood gang from tracking up the kitchen. Replacing the garden faucet so the water spouts upward is the simplest dodge. But adding a standpipe and attaching a second faucet upside down will put the spout higher.

Copyrighted material

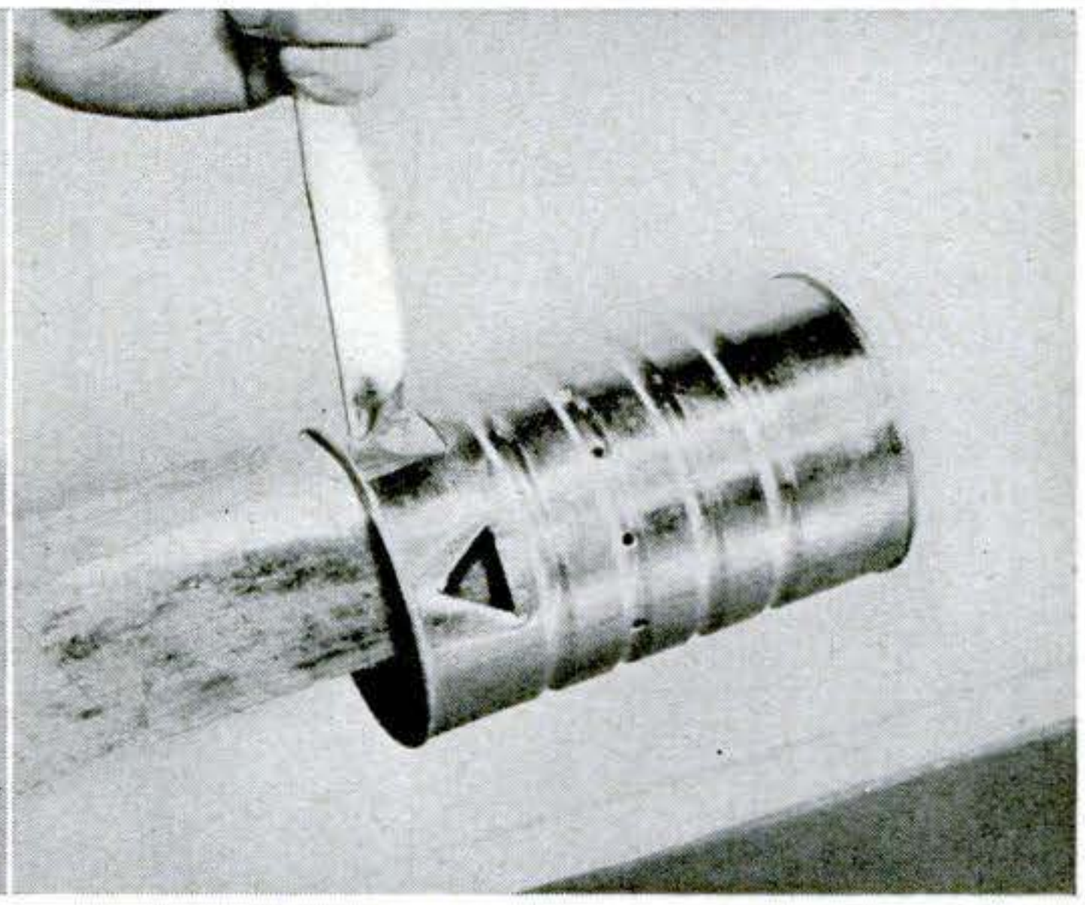
How to Make a
Tin-Can Barbecue

Mate a juice can with a coat hanger, drop in some charcoal, and presto!—you've got a fire for coffee, or bacon and eggs.

QUICK COOKING HEAT at roadside, beach or picnic spot is a cinch with this juice-can barbecue you can make in 30 minutes. One loading of charcoal perks a quart of coffee, fries a panful of eggs or sizzles a small steak.



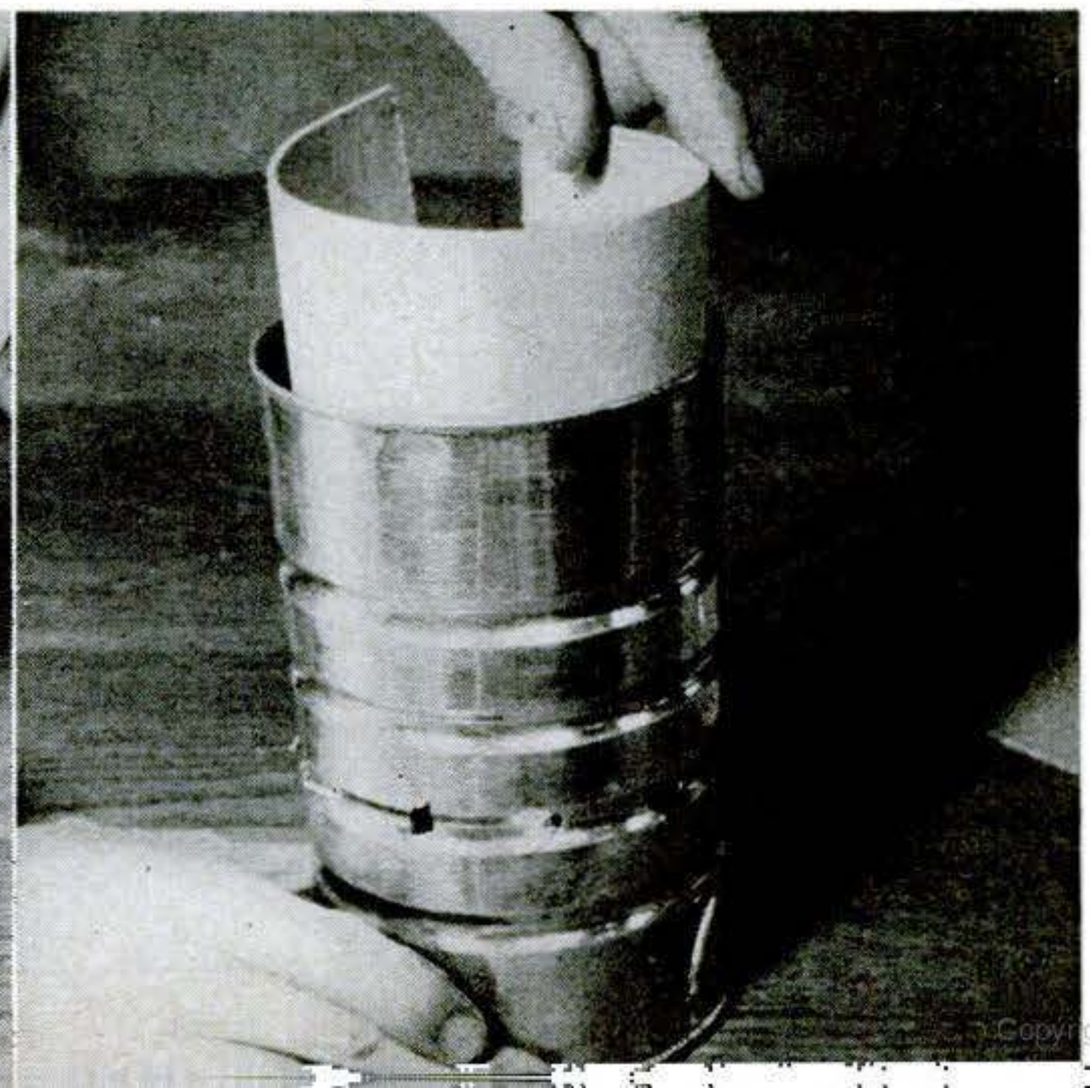
A RIBBED JUICE CAN of the 1½-qt. size forms the body (a similar, larger stove could be made from a 2-qt. or 1-gal. can). With a nail, punch a dozen holes inside one rib, a bit less than halfway up around the can.



CUT OUT cleanly both top and bottom of the can. Then hang it over a fence post or on a stake held in a vise, and use a cold chisel to cut five or six triangular holes around it near the bottom for the draft.

BEND JAGGED EDGES of the triangular holes over on the inside. Then cut pieces of coat-hanger wire and insert them in the holes so that they cross inside the can, forming a grate. Bend the wires over outside like this.

AN ASBESTOS LINER is the secret of success. Cut a strip of sheet asbestos to reach from the grate to the top of the can, and wide enough to overlap itself slightly. It conserves heat and keeps the can from burning out.



Copyrighted material

A professor's experiment shows that even a beginner can build good-looking living-room pieces from easily obtained materials.

Simple Designs Cut Cost of Modern Furniture

By Milt Grassell

PHOTOS BY FRANCIS R. SCHULTZ

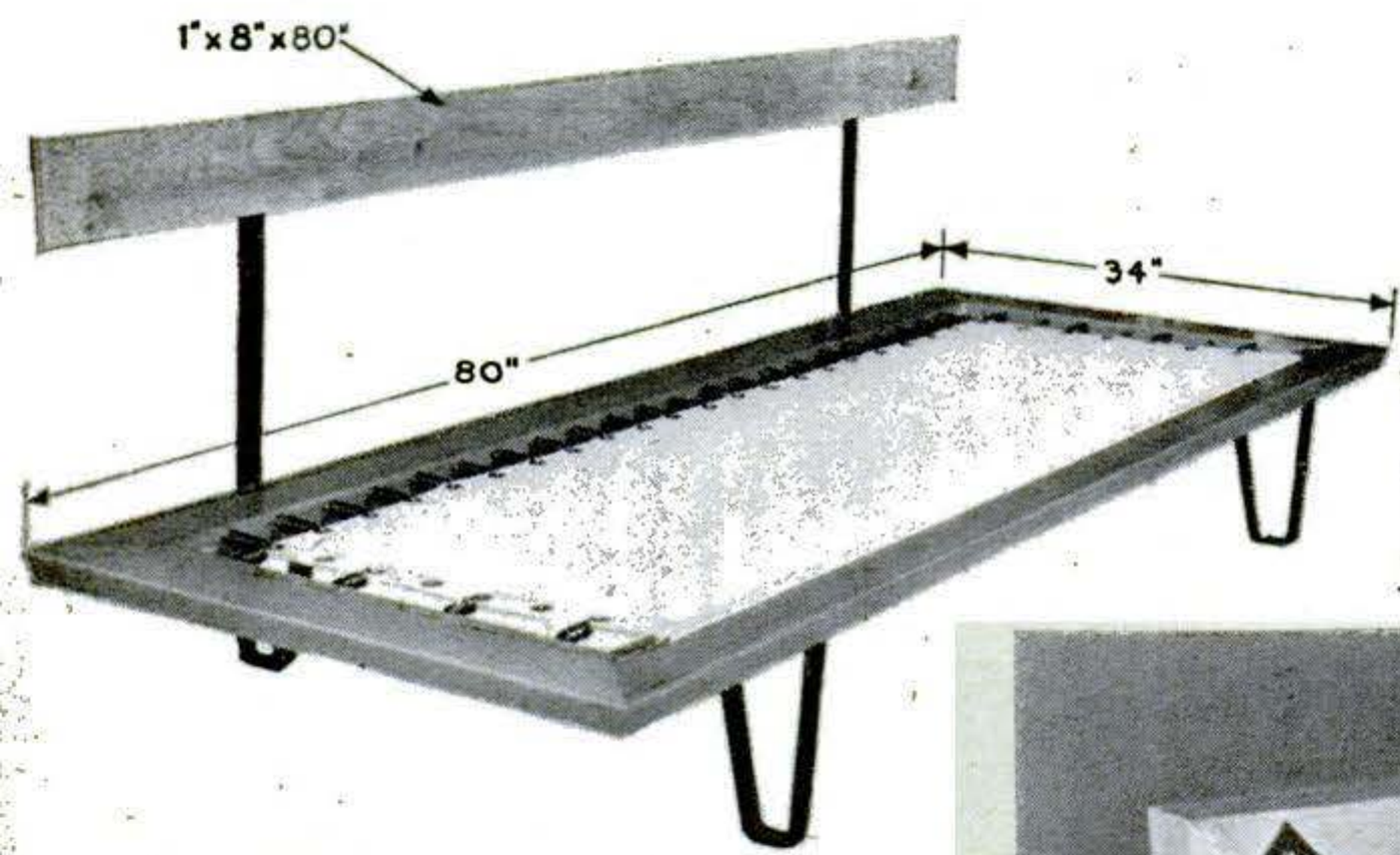
DEMETRIOS JAMESON is an art professor at Oregon State College who had a taste for modern furniture—but without the modern price tags. Then he got an idea: since modern designs are basically simple, they ought to be simple to build. He set out to prove it. The results include a full-size living-room sofa and a pair of matching end tables that are as swank as any store-bought models—at a fraction of the cost.

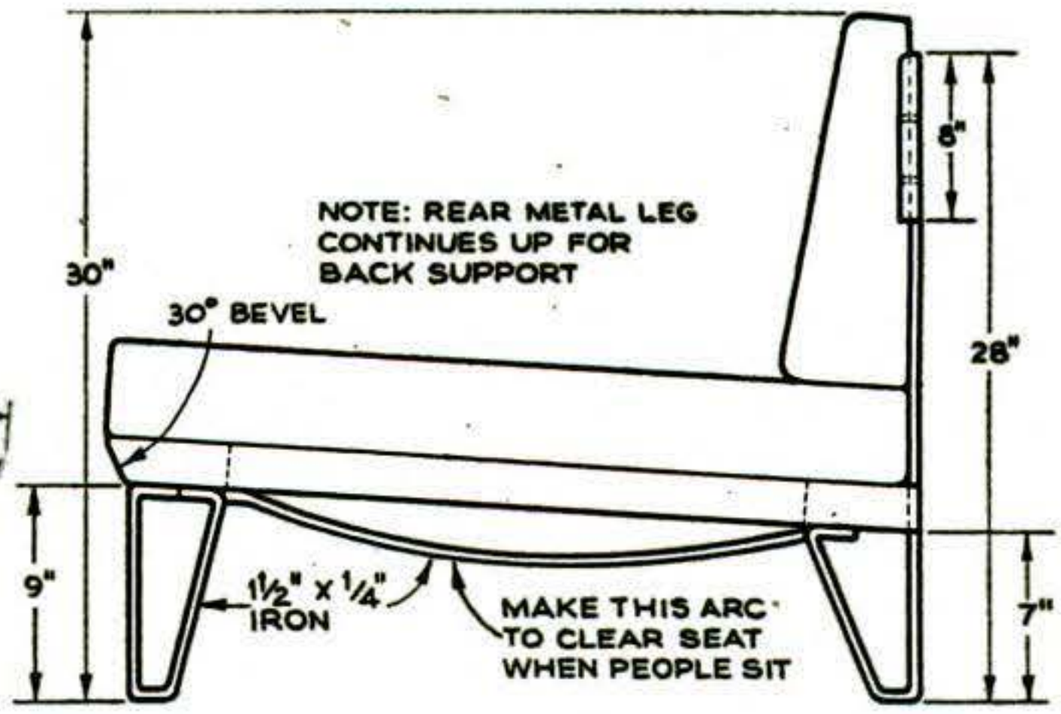
The sofa is just a low frame to support a colorfully covered cushion. Stub legs, bent from cheap metal strap, are carried up at the rear to hold a single plank that serves as a support for the back cushion. By tricky cutting, both seat and back are formed from one foam-rubber double-bed mattress 4″ thick by 54″ wide. Such mattresses can usually be bought from mail-order houses for from $60 to $90.

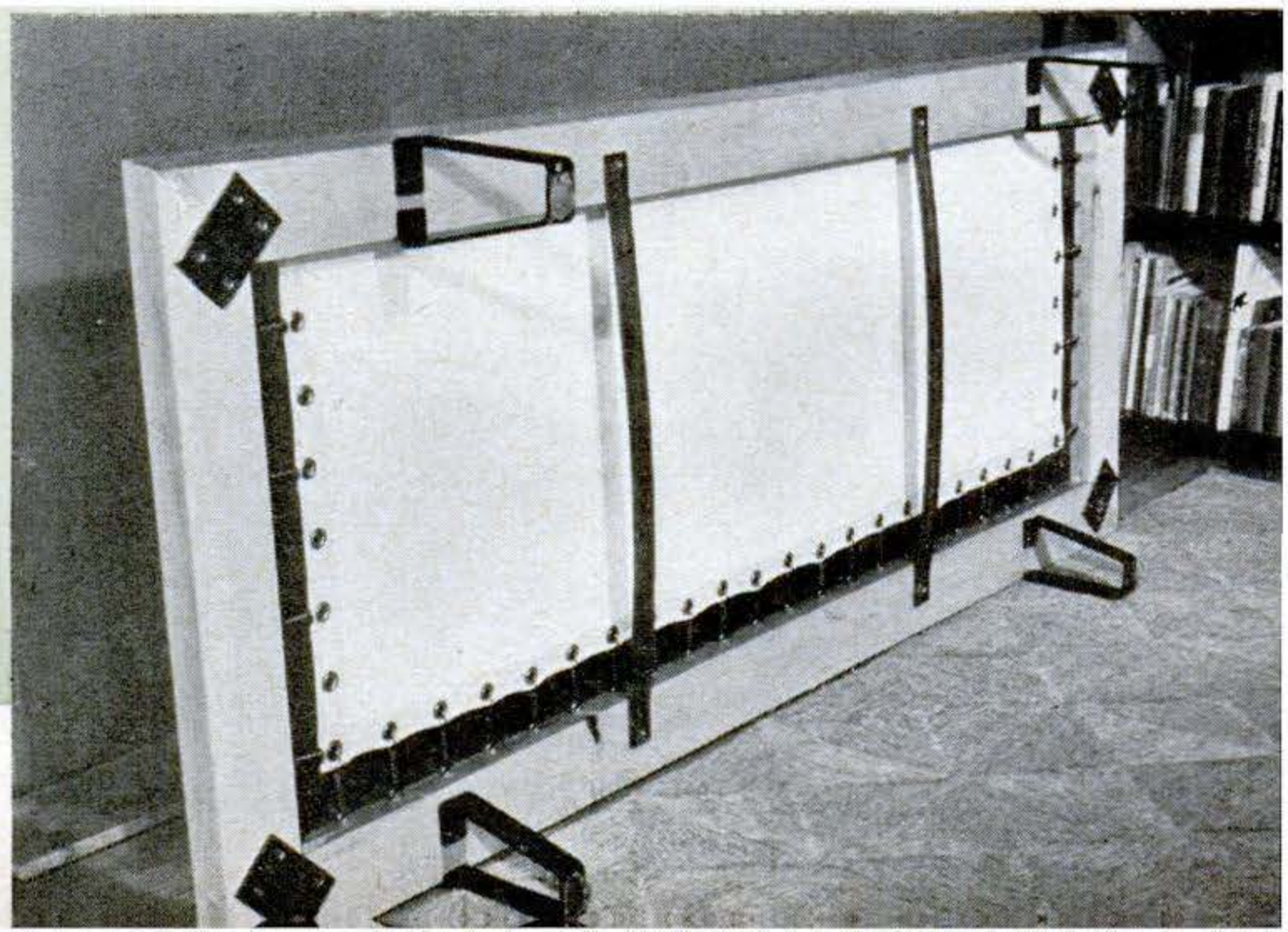
The matching end tables are merely slabs cut from an old solid flush door. To conceal the sawed edges, 1″-by-2″ hardwood strips are fastened around the sides. Hollow-core doors, about half the price of solid ones, can also be used, and here the hardwood edging offers a neat way both to hide and strengthen the exposed core edge.

The legs are ½″ steel rods set into holes drilled in the underside of the tables. On hollow-door tables, the rods can be set into small 2″-thick wood blocks and the blocks glued to the underside. Dime-store crutch tips finish off the lower ends of the rods.

How simple can you get?

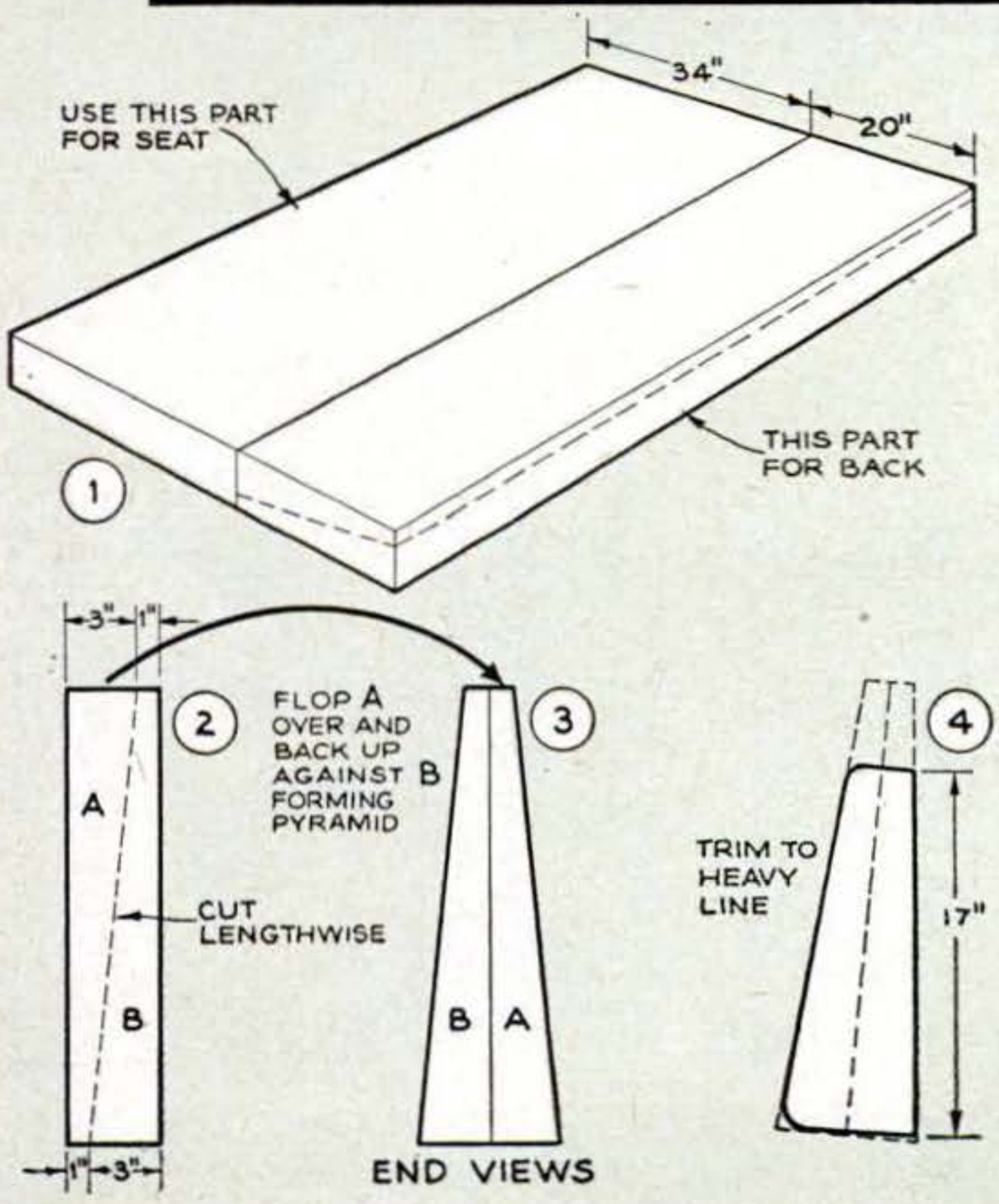




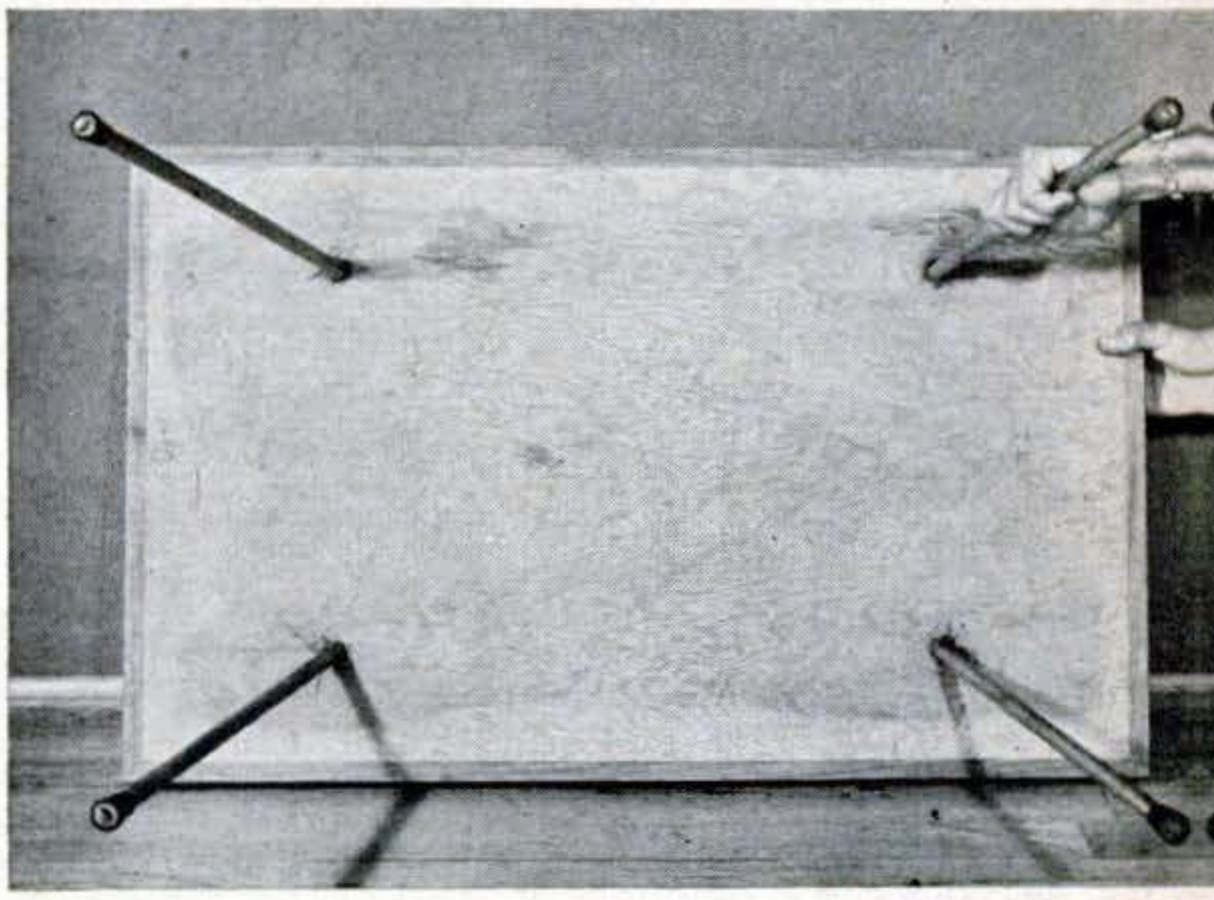


FRAME FOR COUCH is made of two-by-fours braced by metal plates at corners and bowed straps at middle (right). Canvas insert is tacked rigidly to front edge, then fastened to other edges with 2″ springs available at auto and hardware stores. Springs are held to frame by screw eyes 3″ apart and to canvas by eyelets.

How Foam-Rubber Mattress Is Cut to Make Cushions for Couch



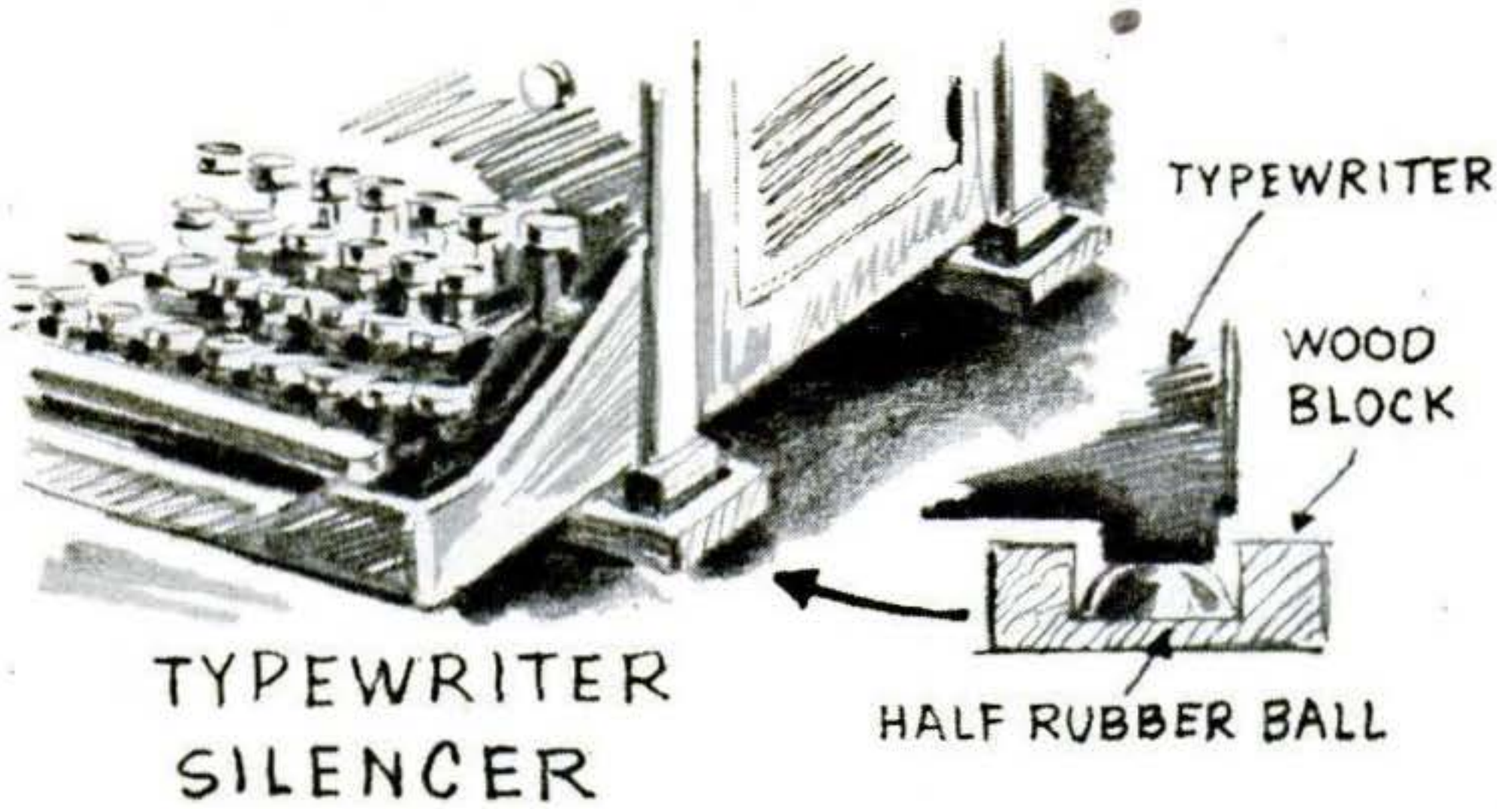
END TABLES, cut from old slab door, are both 34″ long to match depth of couch. Edging of 1″-by-2″ hardwood is glued on and held by small brads. Legs of ½″ steel rod are driven into snug holes drilled at 60° angles to give them outward splay. Table should be level with or slightly above seat height. END

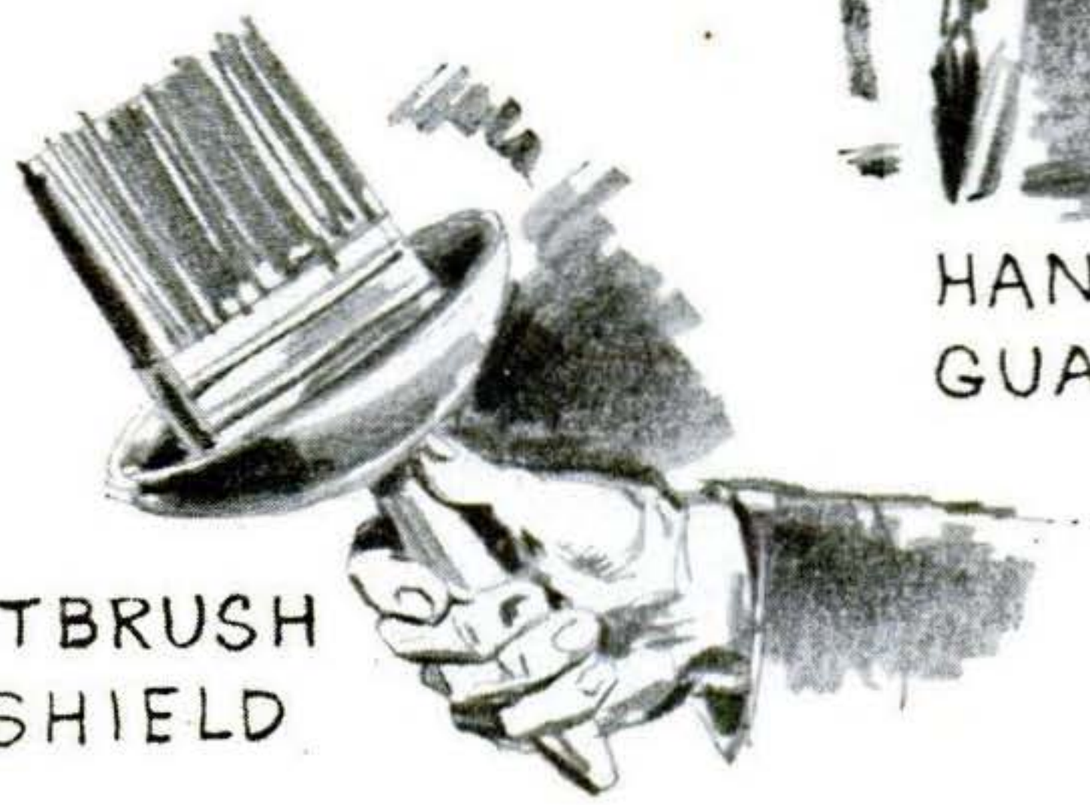


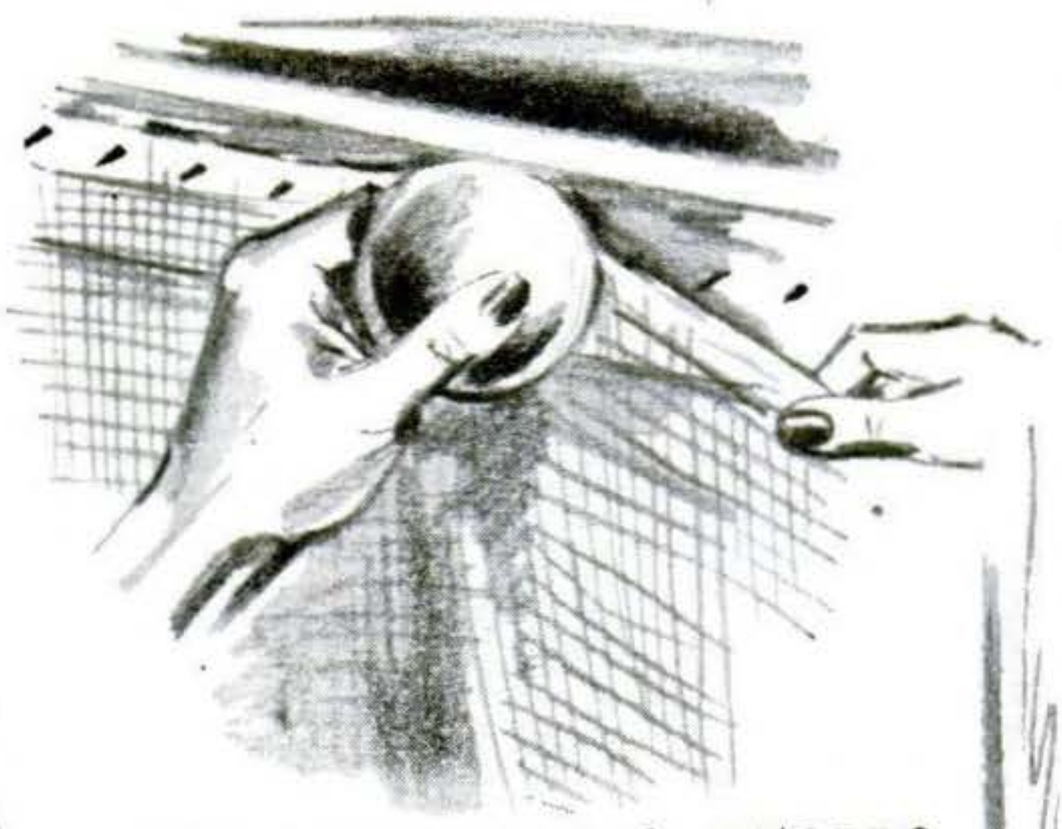
Copyrighted material

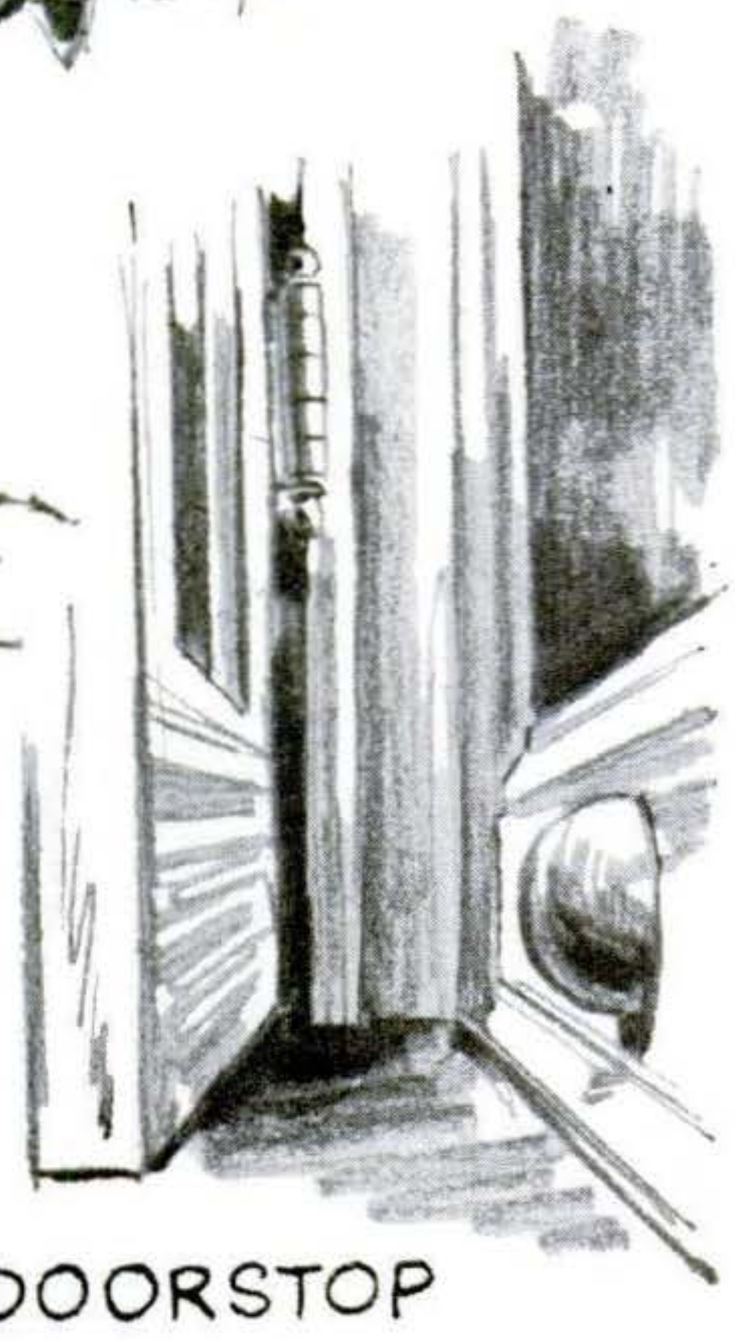
6 USES FOR Rubber Balls

Hollow or solid, large or small, they can do many jobs—if you can get them away from Junior.









Copyrighted material

All the youngsters will have fun this summer on a

Back-Yard Play Platform

A few days' work will give them a sturdy slide, swings, a climbing rope, and a high-level deck with a canvas-walled shelter below it.

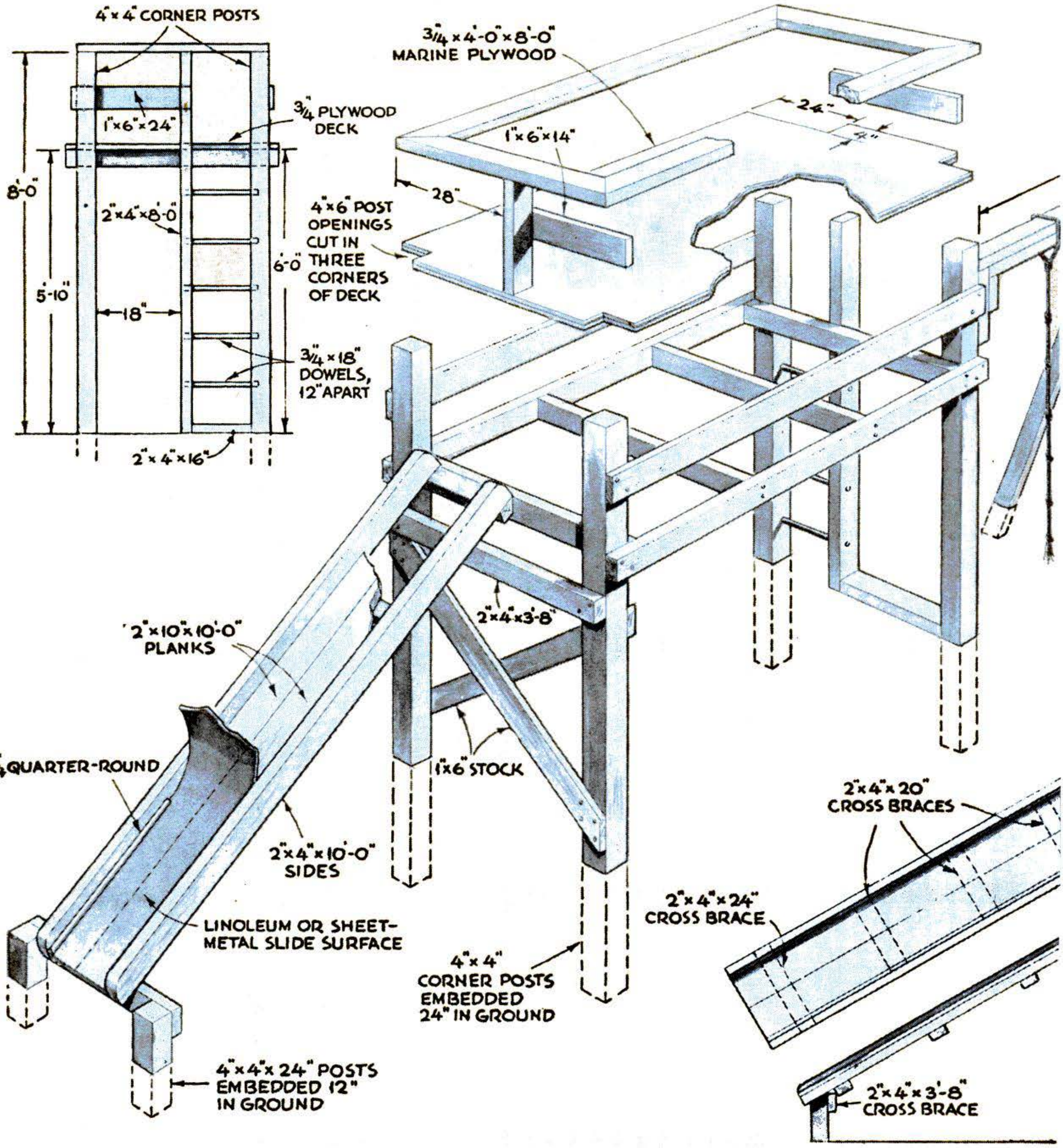
By David C. Miller

OUR back yard is a rocket-launching station, an aircraft carrier or a rodeo corral, depending on the fancy of the youngsters. In summer they shoot down a slide into a plastic wading pool. In winter, their sleds beat Olympic bobsled records on the same steep slope artificially glazed with ice. And the bikes, sleds, toy earth-diggers and other stuff that was always underfoot before we built our back-yard play platform is now stowed away in a spacious canvas shelter under the deck.

You can build a similar platform for considerably less than any comparable outdoor gym you can buy. Ours cost $80, including canvas flaps, rope and hardware.

The platform. We used a 4′-by-8′ sheet of exterior plywood as a starting point for measurements. This was to be the platform deck. Four 10′ four-by-fours serve for uprights. Creosoted and embedded 24″ in the ground, these are linked with a framework of deck-supporting two-by-fours. The long horizontals are nailed to the outside faces of the uprights, with their top surfaces 6′ and 5′ 10″ above the ground, respectively,

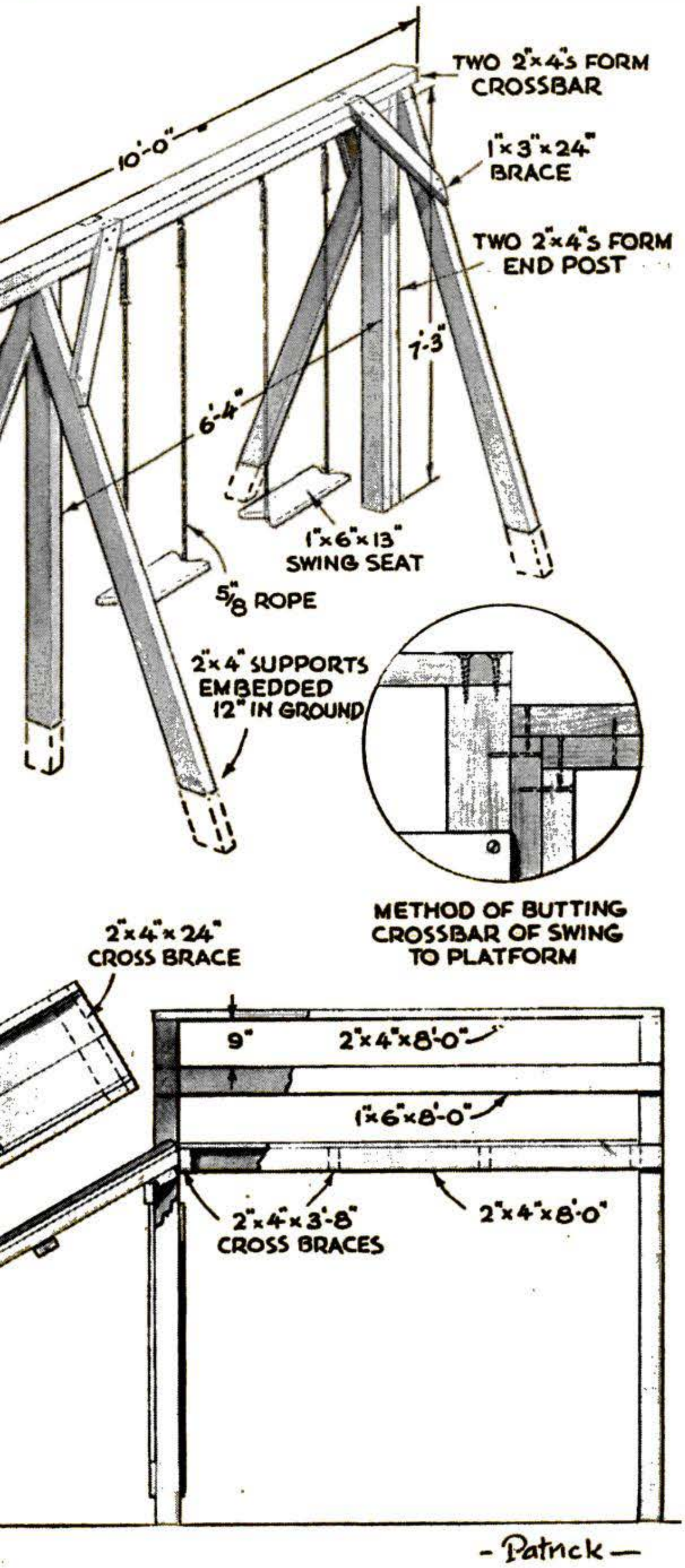
Copyrighted material



which gives our deck a rain-shedding pitch. The cross stringers—four of them—measure 3′ 8″ each. Two are nailed to the inside faces of the uprights. The other two are used as intermediate supports. Rectangles 4″ by 6″ sawed from three corners of the plywood sheet, and a 4″-by-24″ rectangle cut from the fourth corner, allow the plywood to be slipped down between the uprights. The 18″ recess left on one side of the deck gives us a clearway for a ladder.

The ladder. The corner upright on one side of the clearway forms one side of the ladder. The other is an 8′ two-by-four. The rungs are 18″ lengths of ¾″ hardwood doweling placed in holes 1″ deep at 12″ intervals. A spacer block, made of a two-by-four, anchors the bottom end of the ladder. A few nails fasten the top to the platform-supporting cross stringer.

Copyrighted material



AFTERTHOUGHT was this shelter for bikes and toys, made by battening canvas flaps to the platform. When not in use, canvas is rolled and held to the deck with short lashings.

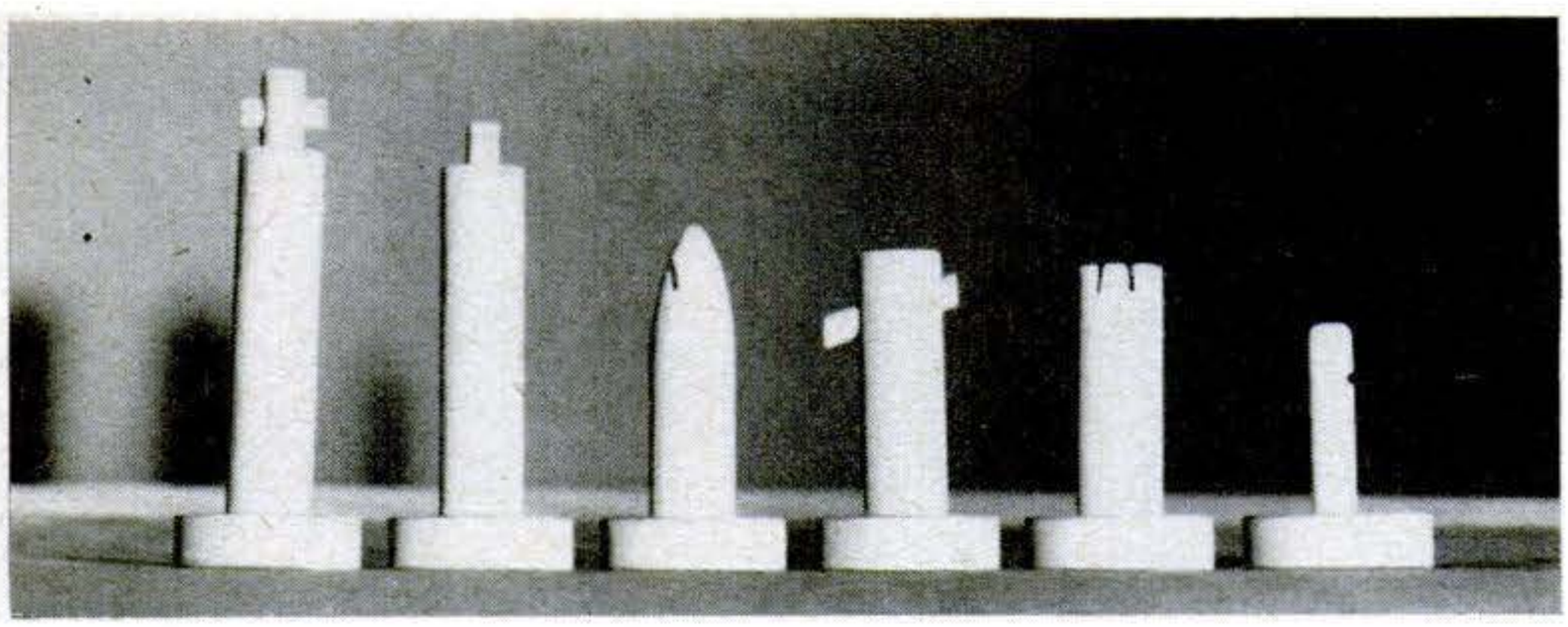
Slide support and guardrails. At the other end of the platform, a 3′8″ length of two-by-four is nailed to the outside faces of the corner posts, with its top surface 5′6″ above the ground. This forms a horizontal support for a slide. Diagonal braces of 1″-by-6″ stock are also nailed across the uprights to stiffen the whole assembly. The sections of the uprights projecting above the deck serve as corner posts for a protective fence around the platform. The top guardrails are two-by-fours placed flat. Midway between them and the deck there is a second set of rails, broken at the ends to let young gymnasts reach the deck from the ladder and take off on the slide.

Building the slide. Our slide is made of two 2″-by-10″ planks, 10′ long, cleated side by side to five two-by-four crosspieces. The top crosspiece is beveled and nailed flush against the deck-supporting stringer.

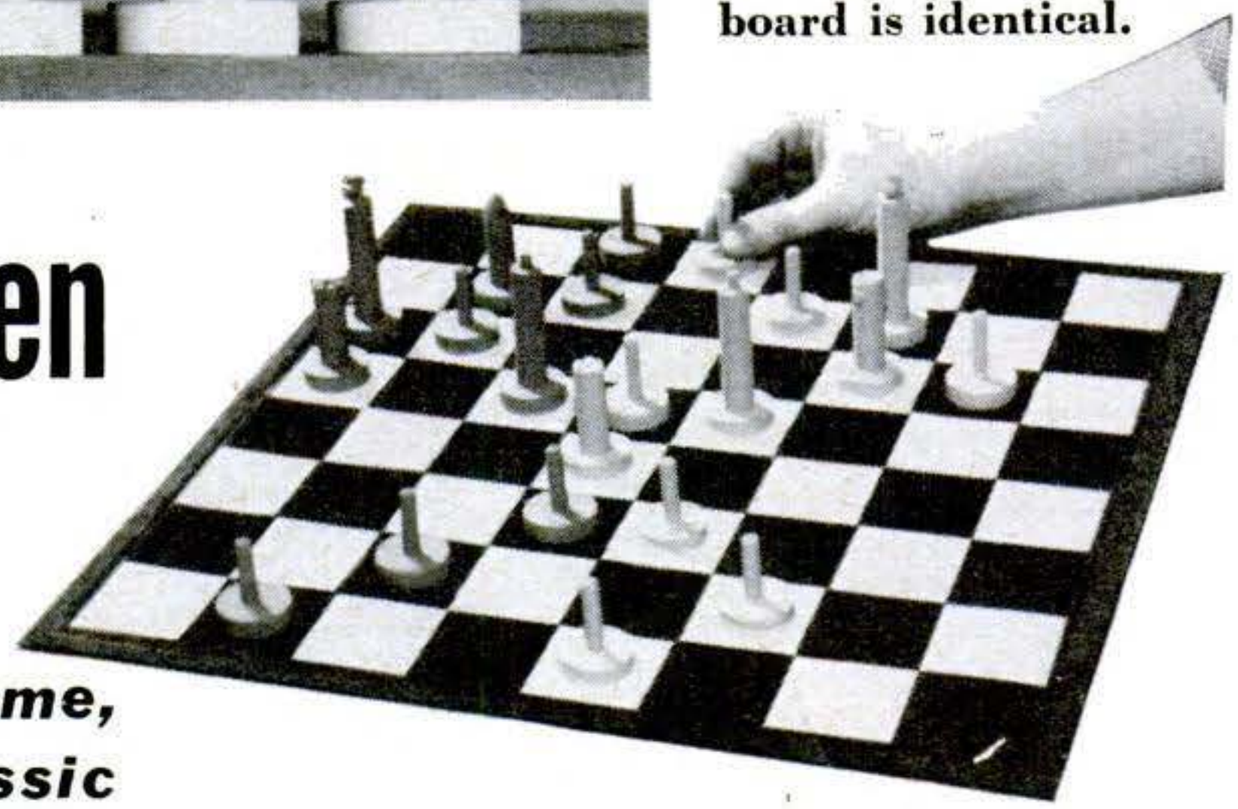
An alternate way of anchoring it would be to use a wider crosspiece, one that would lock over the slide support instead of simply resting on it. Either way, the slide is prevented from pulling away from the platform because its bottom crosspiece butts against a 3′8″ piece of two-by-four nailed between two 24″ lengths of four-by-four, each embedded 12″ in the ground. Slide sides are two-by-fours, nailed to the edges of the planks. For a smooth slide surface we used linoleum. Sliders are kept from catching their clothes on the nails that hold the linoleum in place along the edges by two strips of quarter-round.

The swing gantry. Two-by-fours, nailed together to provide intersupported ends (see detail drawing), made a sturdy swing gantry. The horizontal member is butted to one platform upright, where blocks below it hold it firmly. Three feet out, a single two-by-four separates the climbing rope from the swing section. Both the two-by-four and the built-up four-by-four at the outer end of the gantry are braced by diagonals. We used piping for these braces, but two-by-fours would do. In either case, both uprights and diagonals should be embedded 12″ in the ground. Less than 50′ of rope, five screw eyes and two swing seats rounded out our project, except for the addition of canvas flaps. END

Copyrighted material



THESE ARE THE FIGURES. From left to right: king, queen, bishop, knight, rook and pawn. Usually, chessmen are black and white. Those shown here are painted ivory and red. The game is played on board that came with checkers, as chessboard is identical.



Modern Chessmen Made of Dowels

You can make these handsome, simplified versions of classic pieces for less than one dollar.

THE game's the thing in chess. An elaborate set of chessmen is secondary. Still, these dowel figures make a cleanly styled set. Raw materials? Lengths of ½″ and ¼″ dowels, a few inches of lollipop stick and some paint. Checkers with holes bored in them support the figures.

Buy two boxes of checkers. They come 30 to a box and 32 chessmen are needed. Extras are handy if you split some.

Pawns (16 required) are 1¼″ lengths of ¼″ dowel rounded on one end.

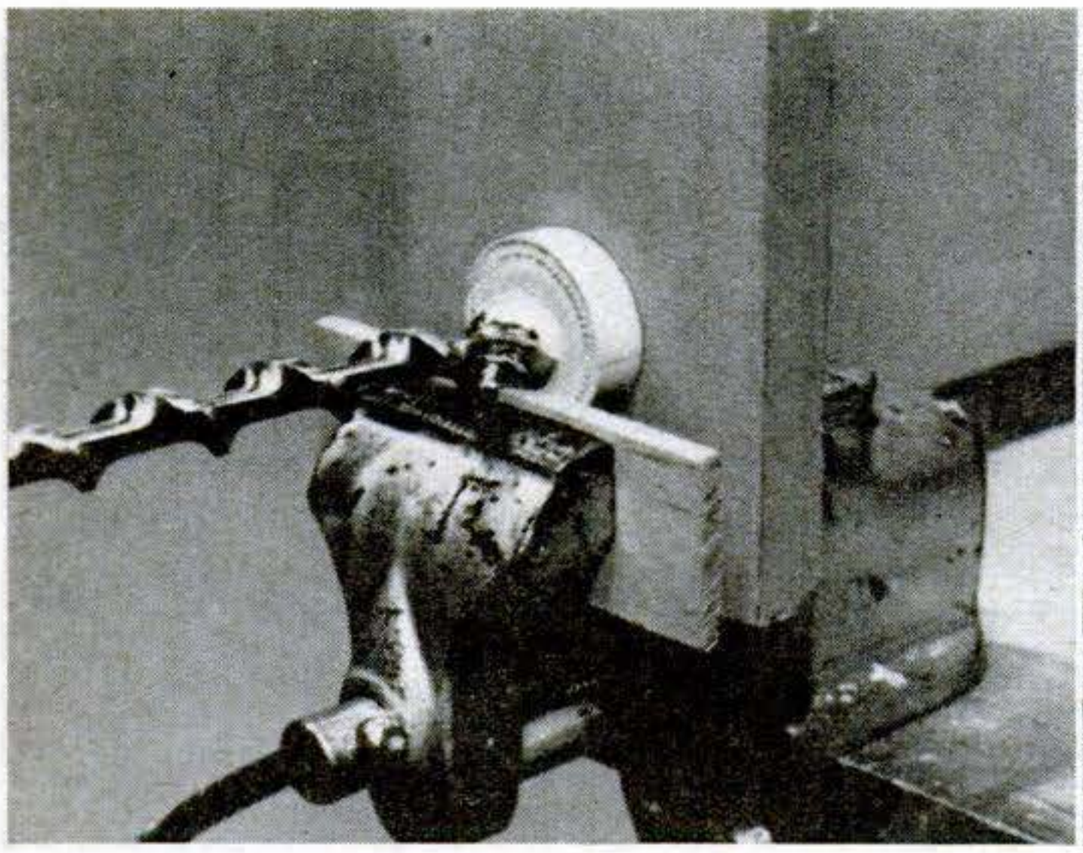
Rooks (4) are made of ½″ dowels, 2″ long. Saw cuts at top simulate castle tower.

Knights (4) are also 2″ lengths of ½″ dowel. Drill holes at an angle near the tops for short pieces of lollipop stick.

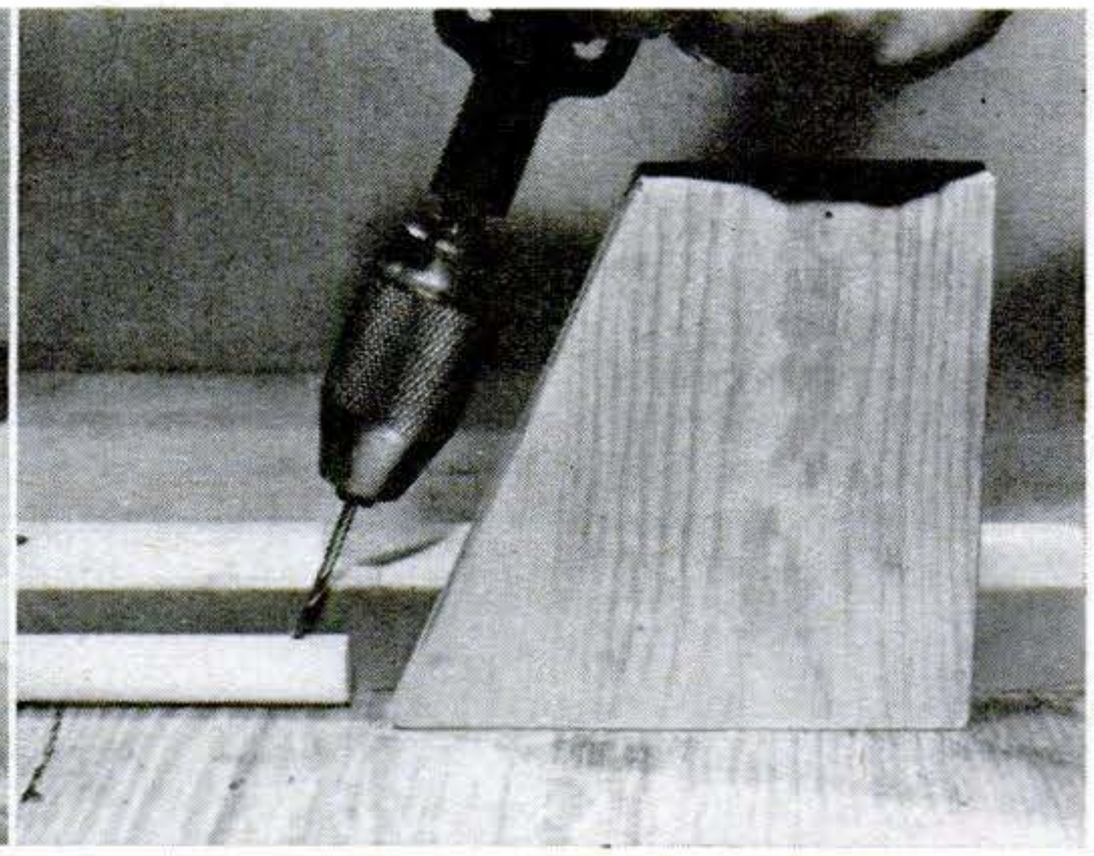
For bishops, (4) turn or whittle Gothic ends on 2″ lengths of ½″ dowel. A saw slit at an angle near the top symbolizes the bishop's miter.

Queens (2) are taller. Drill tops of 2½″ lengths of ½″ dowel and insert pieces of lollipop stick, leaving ¼″ projecting.

Kings (2) are 2½″ lengths of ½″ dowel with tops drilled for ¼″ dowel. Leave ½″ of dowel projecting and drill through it for piece of lollipop stick to form cross "crown."



WHEN BORING CHECKERS, back them up with a piece of scrap wood on the bottom side. Wood strip protects checker top from bite of vise.

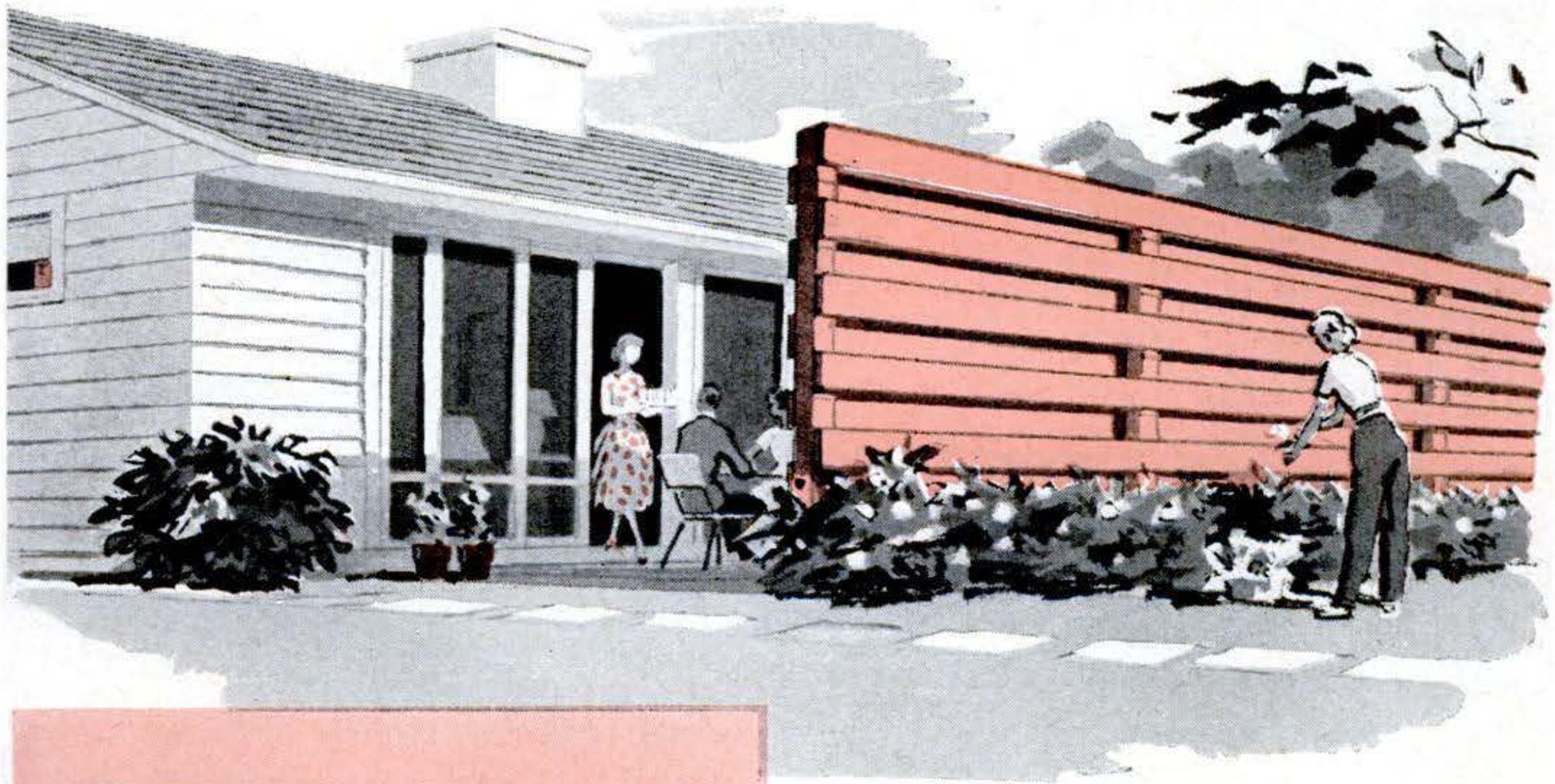


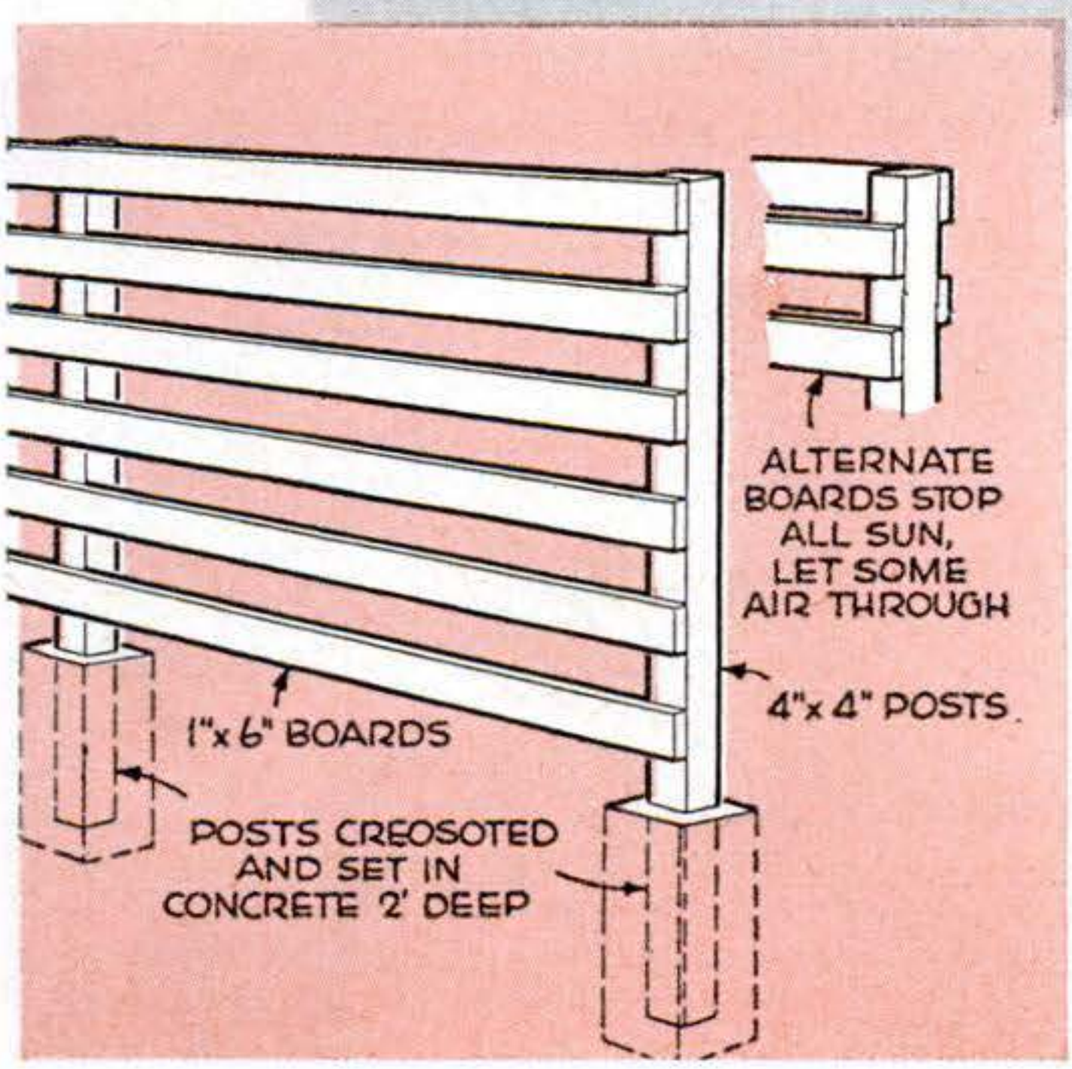
DRILL HOLES FOR KNIGHT CROSSPIECES at uniform angle by sight-guiding along wood piece cut to 60° on one edge.

Copyrighted material

Need some shade, more breeze or less, or a little privacy to make summer living more comfortable? Take a look at these . . .

Sun and Wind Screens for Your Home





Sun fence, built higher than ordinary fence, is a good way to get shade on a western exposure that faces the hot afternoon sun. Using alternating boards nailed on opposite sides of 4"-by-4" posts (at top of page) will shut out nearly all sun but still let some breeze through. Spaced boards (at left above) let some sun through, but take only half as much lumber to build. Space posts not more than 8′ apart, and cement ends at least 2′ in ground.

By Sheldon M. Gallager

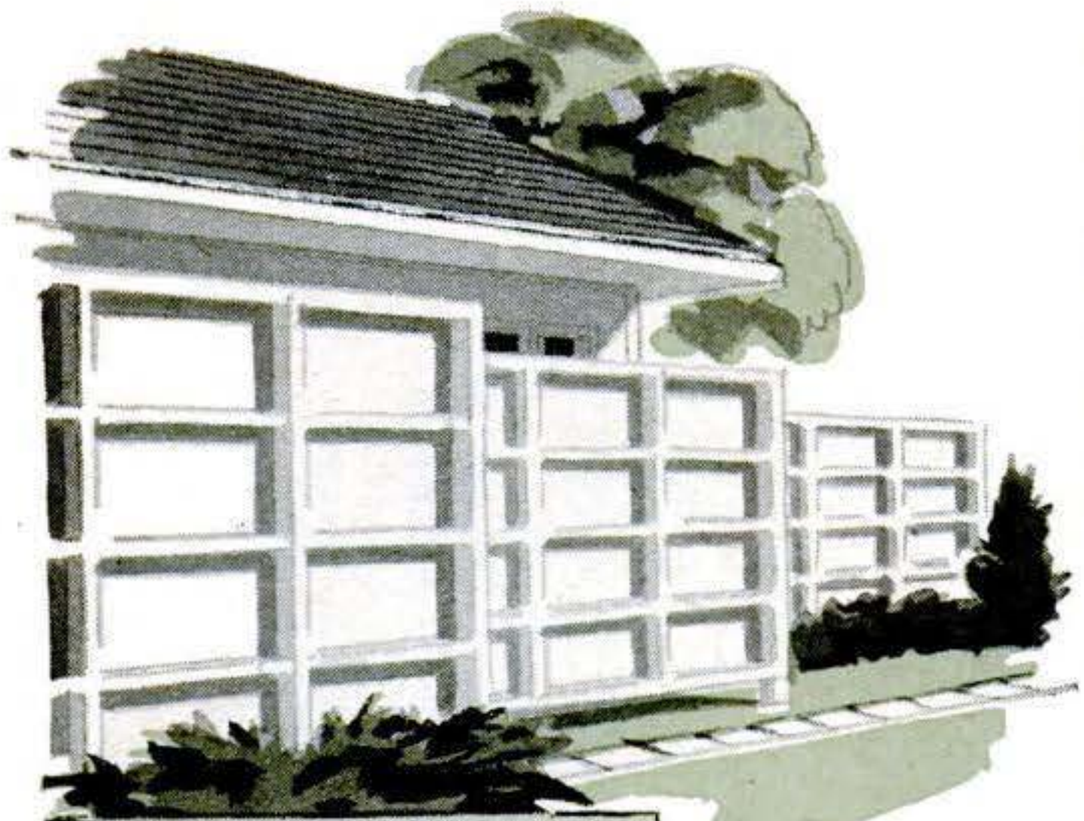
AS NICE as summer living is, nature may not have just happened to deposit a shaded woods, cool shore breezes and a mountaintop view all in your own back yard. To stay comfortable, you may have to add a bit where nature left off.

You'd like more shade, but a sunbreak would block all your light. Maybe you're tired of looking at your neighbor's trash, but a privacy fence would also cost you that last whisper of a much-needed breeze. Perhaps you have too much breeze, but a windbreak would kill a fine view.

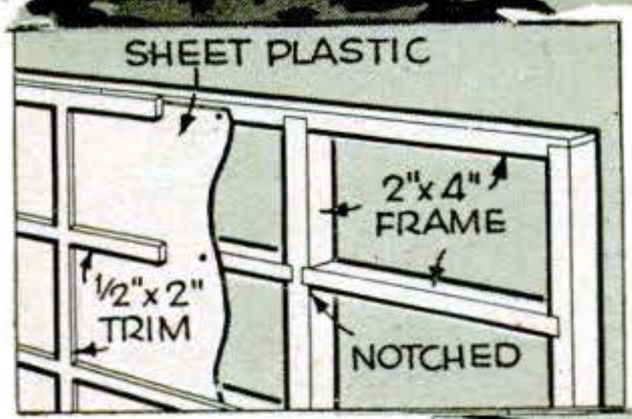
Whatever the problem, here are several ways to keep out what you don't want while letting in what you do. By selecting one that best suits your needs, or by combining several types, you can custom-tailor your summer living for real summer comfort. Please turn the page for more ideas.

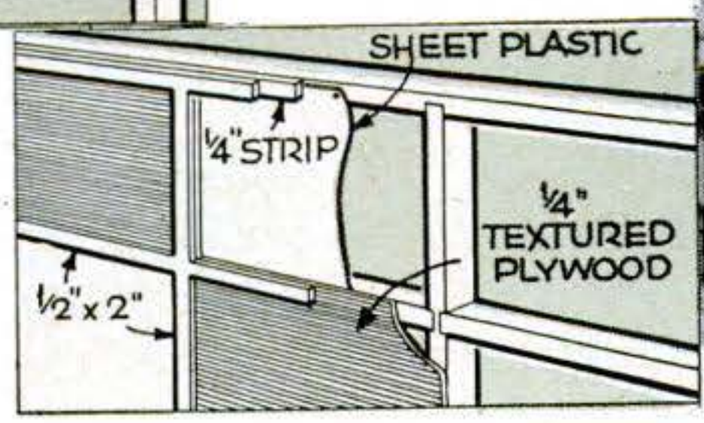
Copyrighted material

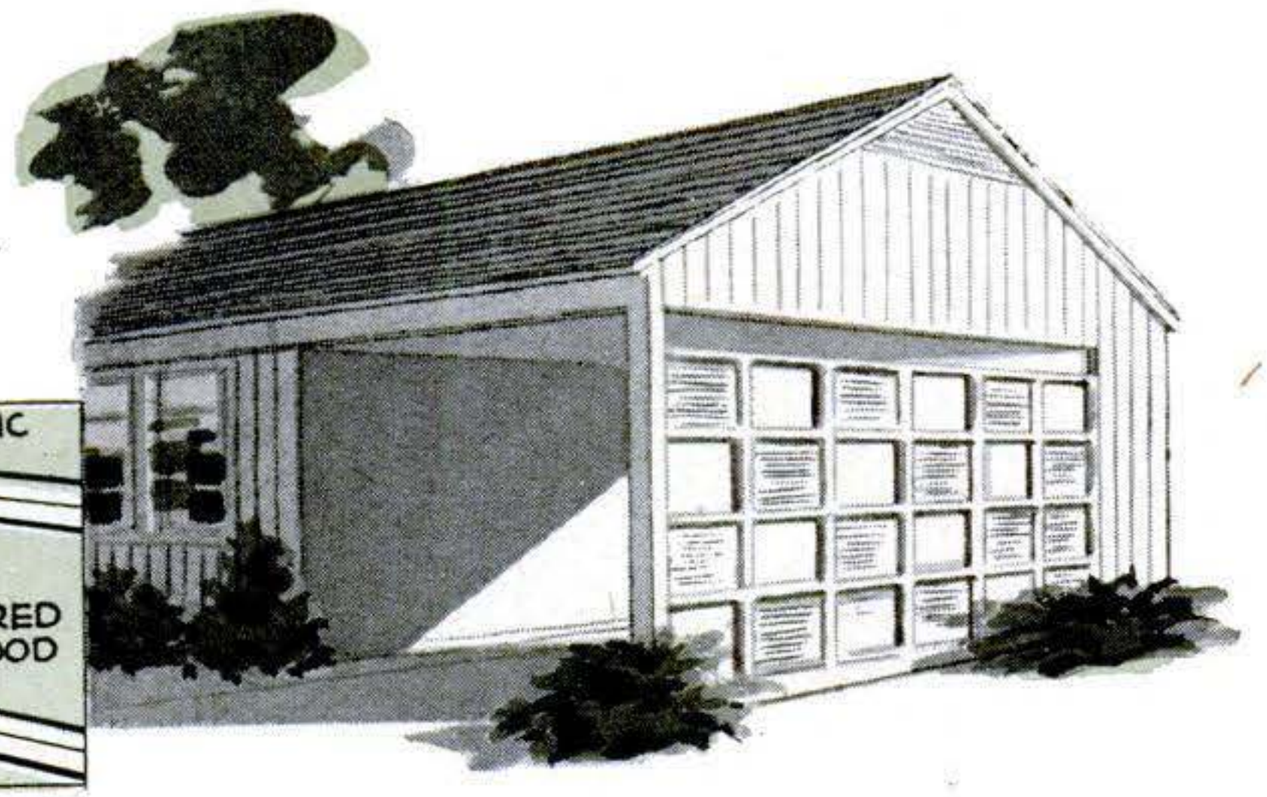
4 More Ways to Put the Sun and the

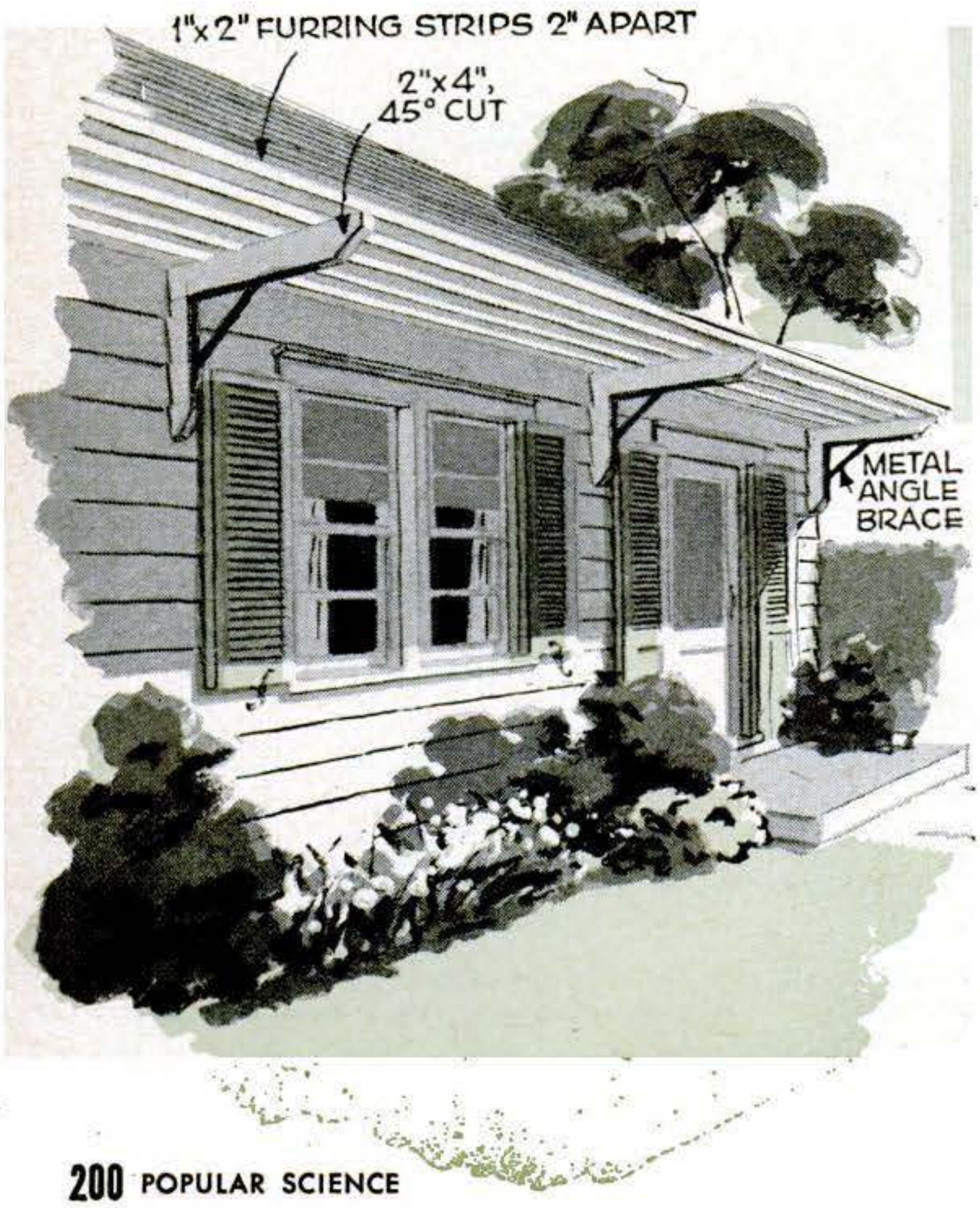


Translucent plastic cloth, the inexpensive kind used to screen in chicken coops, lets sunlight through, but shuts out heat and your neighbor's garbage can. Staggered panels (at left) act like gigantic louvers, letting cool breezes through without sacrificing shade or privacy. Plastic panels are also a neat way to enclose an open carport for a terrace (below) or a breezeway for an outdoor dining area. Use type that has fine-mesh, metal fly screen embedded in plastic for strength, and keep individual grid sections to 2′ by 3′ or less to avoid sagging of material. You can get a striking decorative effect by combining plastic panels with thin textured plywood in a checkerboard pattern (at left below).









How to Find Overhang Width

To find amount of overhang for your locality, first look up your latitude on a map and select matching factor from chart below. Then measure desired shadow height and multiply this by the latitude factor. Result will be width of overhang.

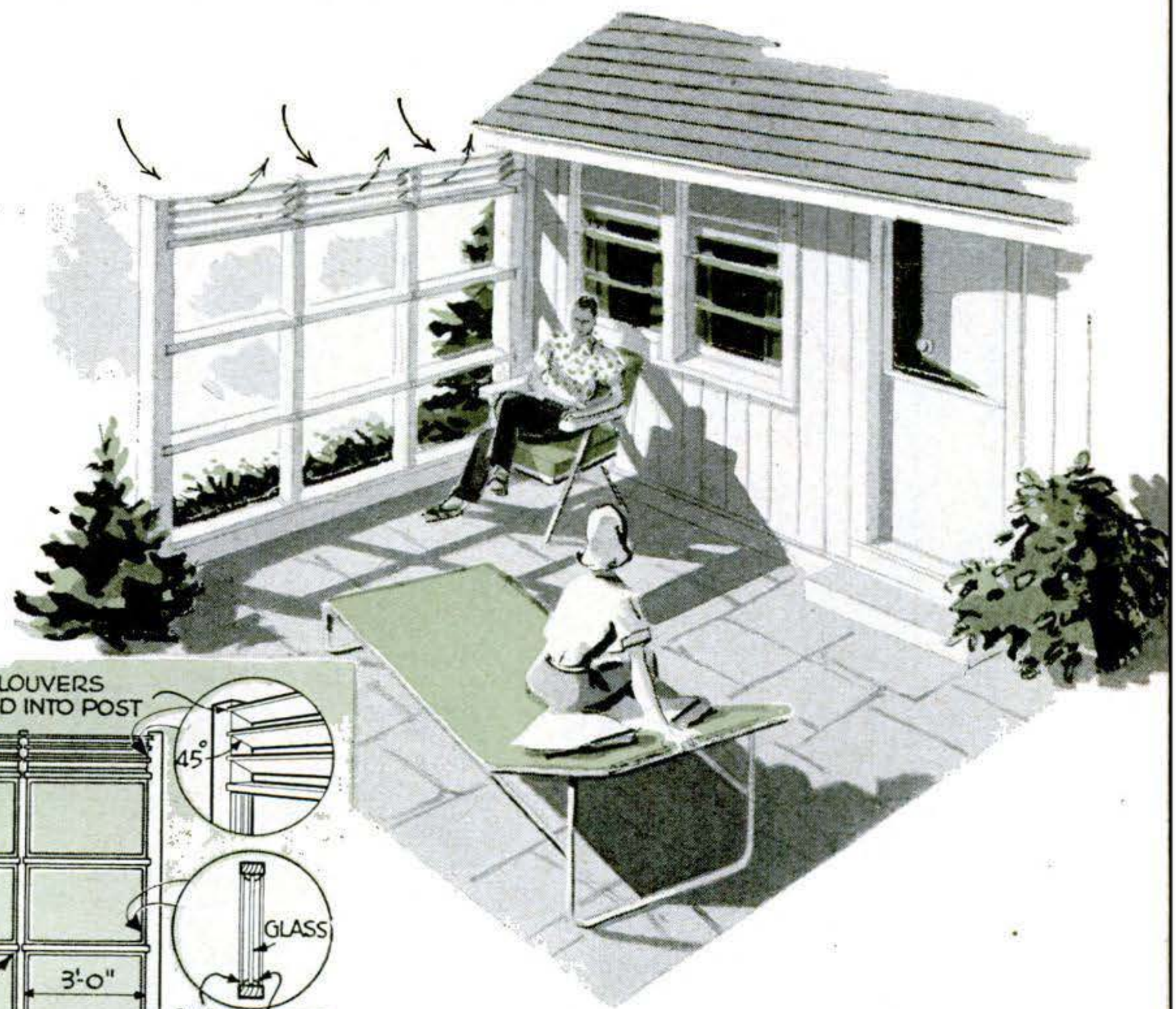
LATITUDE	**25°**	**30°**	**35°**	**40°**	**45°**	**50°**
FACTOR	**.37**	**.48**	**.59**	**.71**	**.85**	**1.02**

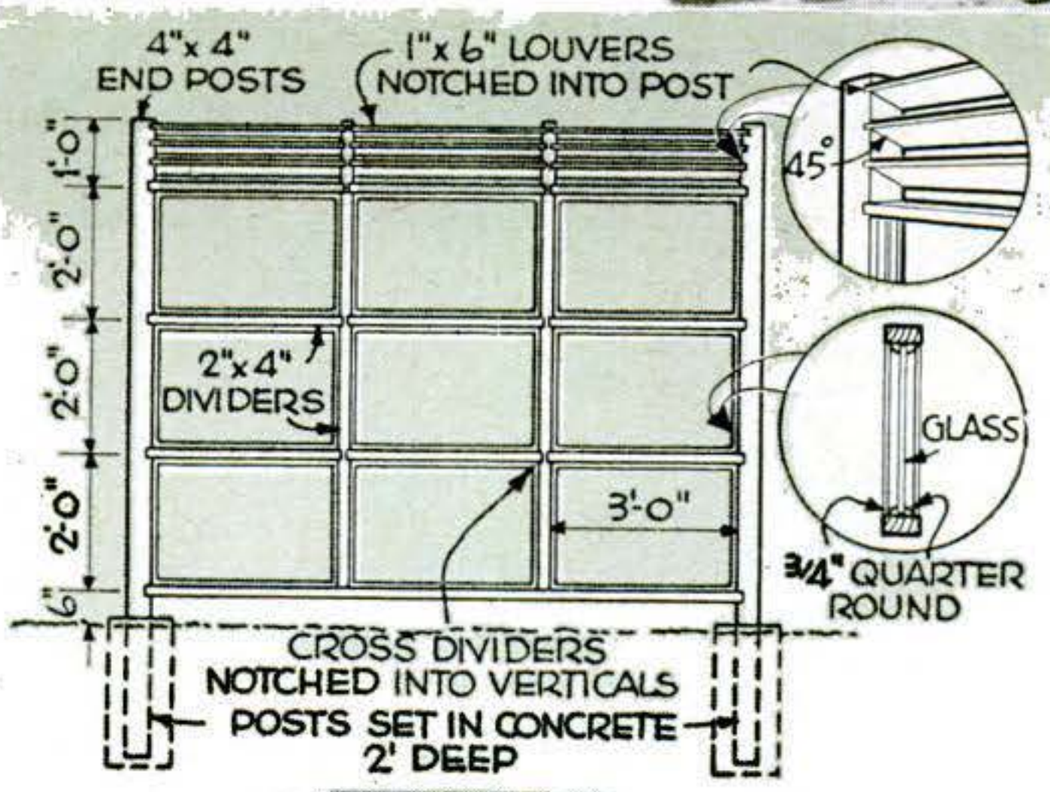
Roof overhang shades windows when sun is high, is especially effective on south side of house where sun beats down all day. Simple slat-type extension, made of inexpensive 1″-by-2″ furring strips supported on metal brackets, has modern appearance and creates pleasing shadow patterns on house and ground. If more than 2′ wide, overhang can be braced on outer edge by posts in ground at 4′ intervals. Short sections can also be made to cover only individual windows. Fasten overhang under edge of roof so it will not interfere with rain gutter, and paint brackets to match house. Table above shows how to figure the amount of overhang you need for any desired height of shadow on the wall of the house.

Copyrighted material

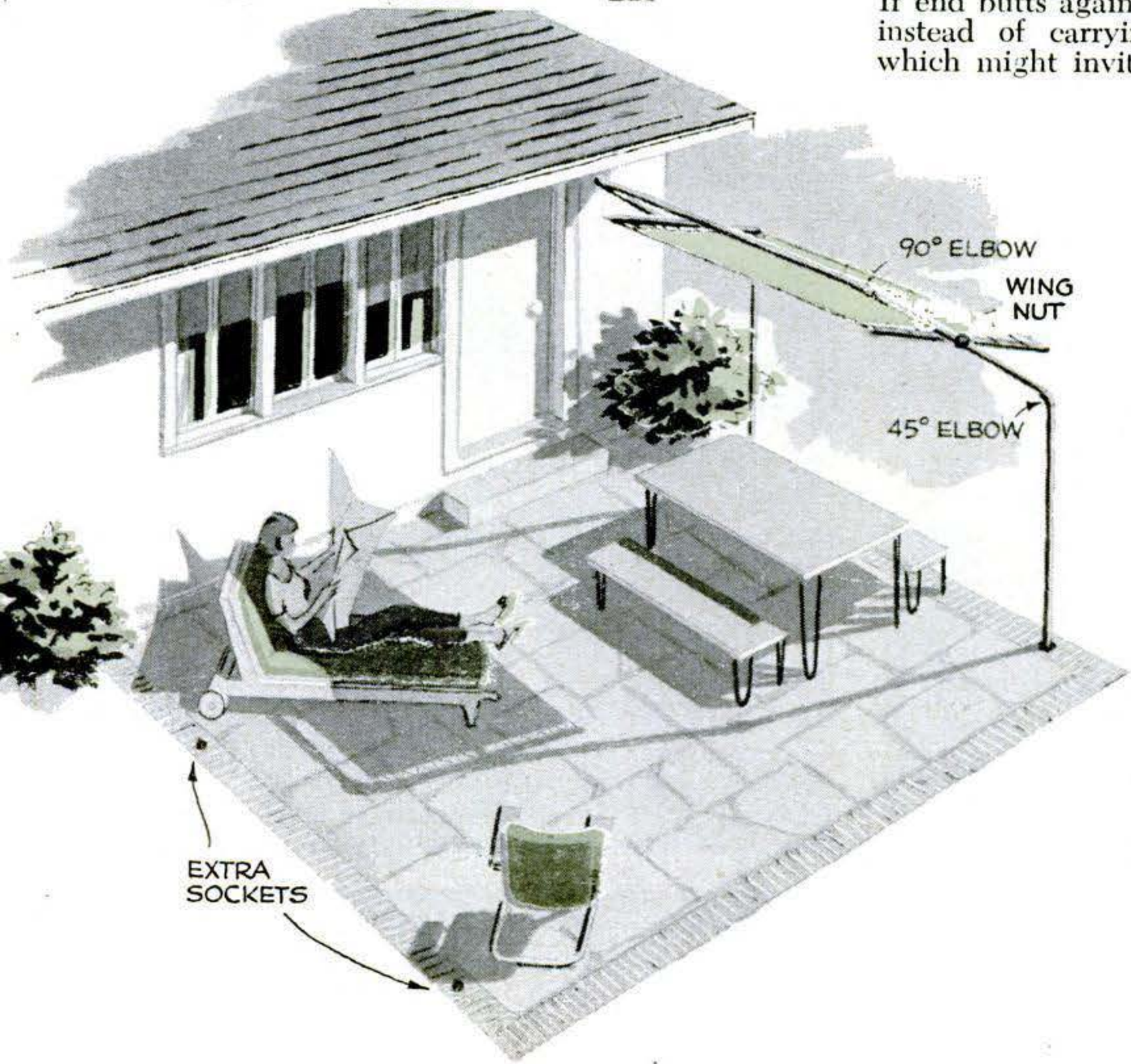
Wind Where You Want Them

If you have a good view, but a little too much breeze to enjoy it, this glass windbreak may be the answer. Good for gusty hilltops and shoreside spots, it's made of inexpensive single-weight window panes set in a wood frame. Slanting louvers at the top help channel the wind upward so it won't spill down over the edge. Narrow open space at the bottom lets some breeze through and reduces wind-loading on the fence.





Glass windbreak is made much like ordinary window, except that careful fitting and sealing are not needed. If fence is longer than 9′, add extra posts at 6′ intervals to support weight. If end butts against house, nail it to wall studs, instead of carrying post down into ground, which might invite termites.



Shade to order. This pivoted canvas baffle can be tilted horizontally when sun is high, then gradually swung vertically as sun sinks low in the afternoon. A simple frame of pipe, it can be slipped into duplicate pairs of ground sockets for quick switching from one side of a terrace to the other and for removal in winter. For spans up to 4′, use 1″ pipe (inside diameter); beyond that, 1½″ or 2″ pipe. Make ground sockets of next larger pipe diameter that will slip over ends of frame, and cement 1′ lengths in ground. Lash canvas to pipe arms with heavy cord through eyelets. Use ⅜″ bolts with wing nuts to tighten arms against upright frame. END

Copyrighted material

Pivoted Sign Can Be Quickly Changed

OPERATORS of motels and tourist homes can save time with a sign like this. Just pivot it to display the "no vacancy" lettering. Make the frame of one-by-twos. Install a removable pin in a hole to keep the wind from turning the sign.—*L. G. Lands, Charlotte, N.C.*

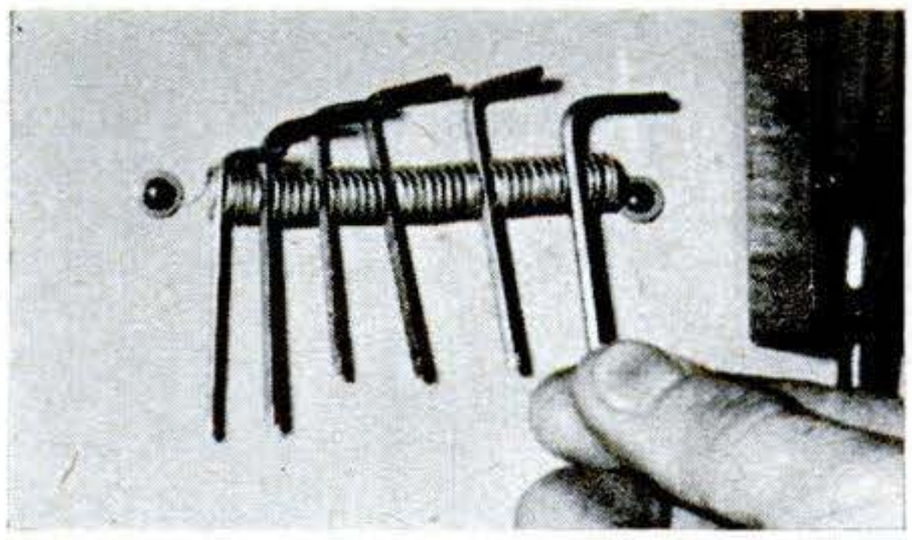
Oily Sand Stops Rust

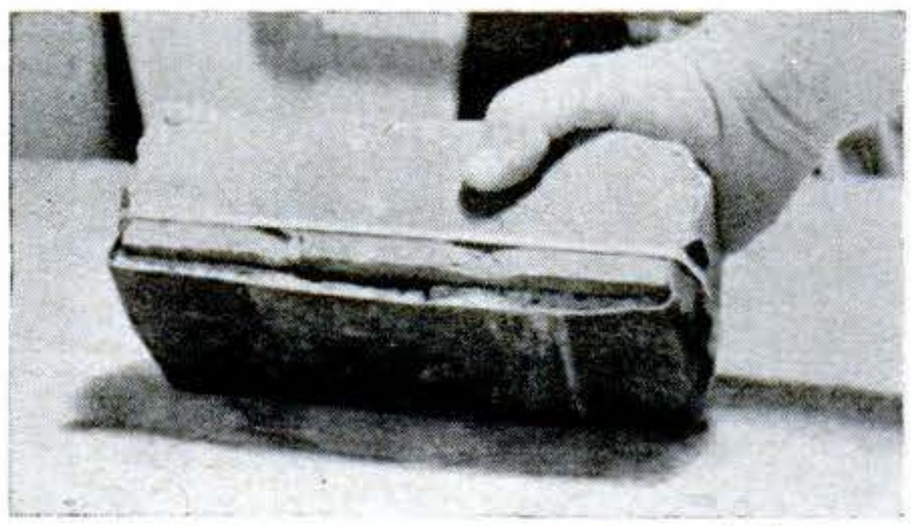
GARDEN tools won't rust if you run the metal parts through a box of sand mixed with some crankcase oil each time after they are used.

DO IT THE EASY WAY

TO MEASURE a level spoonful of powdered coffee, cut and remove half of the paper seal on the jar. Use the edge as a scraper to smooth the coffee.

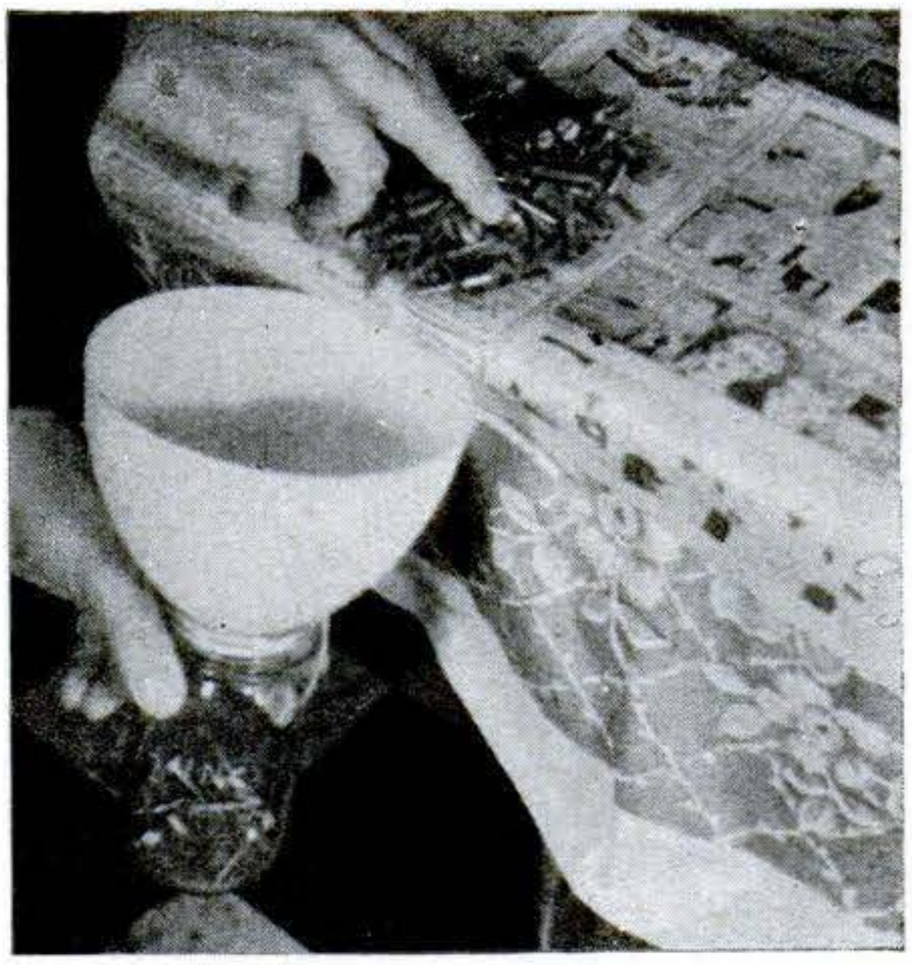
YOU WON'T HAVE TO FUMBLE around looking for small hex wrenches if you store them in a spring holder like this.





AS A SANDING BLOCK, you can't beat a brick. Pad it with cloth and attach the abrasive paper with a rubber band. The weight saves pressing so hard.

A PLASTIC LAMP SHADE is handy as a shop funnel. It's especially good for returning small parts to a container.



Copyrighted material

THIS IS THE DIFFERENCE between the way a black bear looks to unaided eyes (left) and through binoculars of 7X power (above).

How to Buy Binoculars

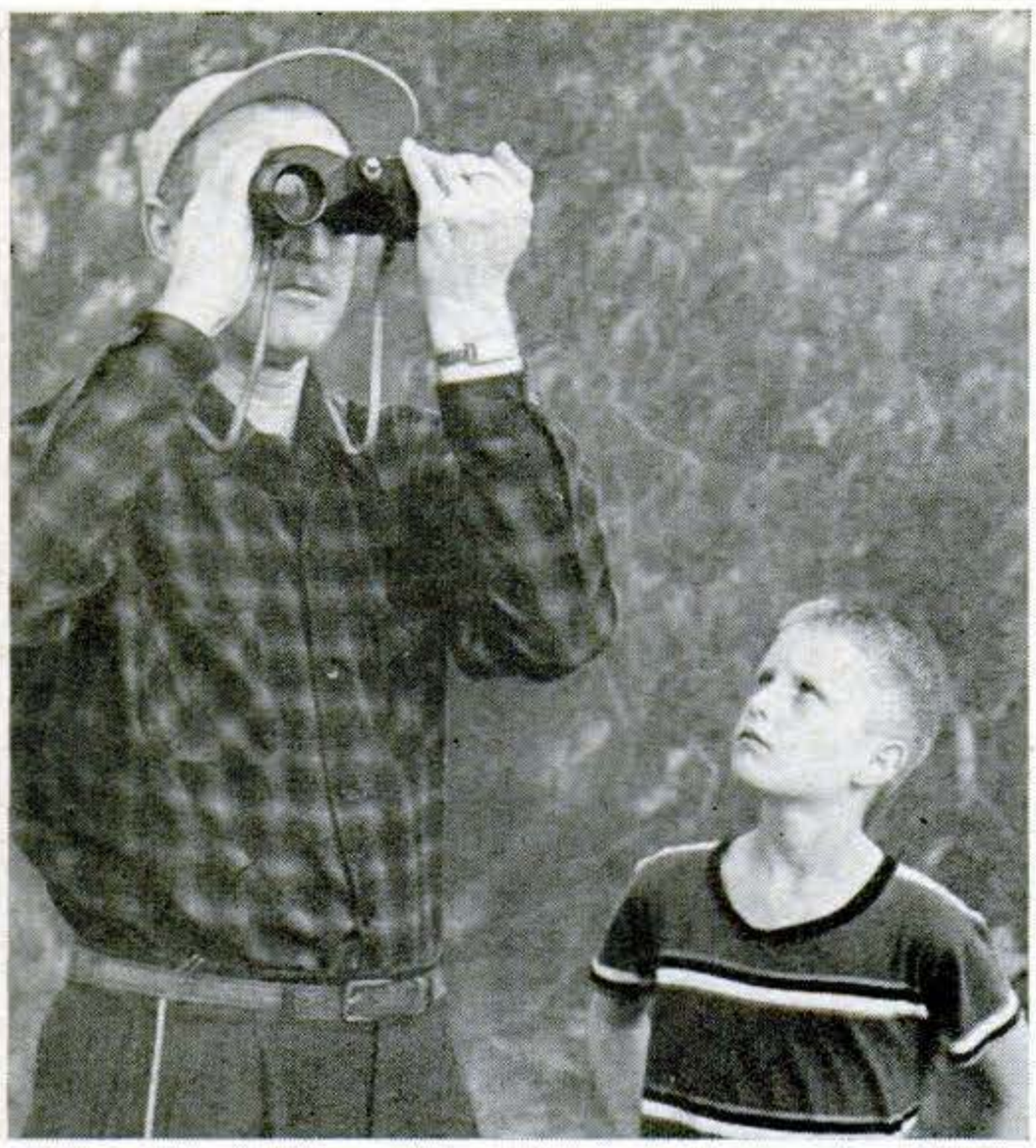
Which features are necessities? Which are luxuries—or mistakes? Here's how to tell.

By Shep Shepherd

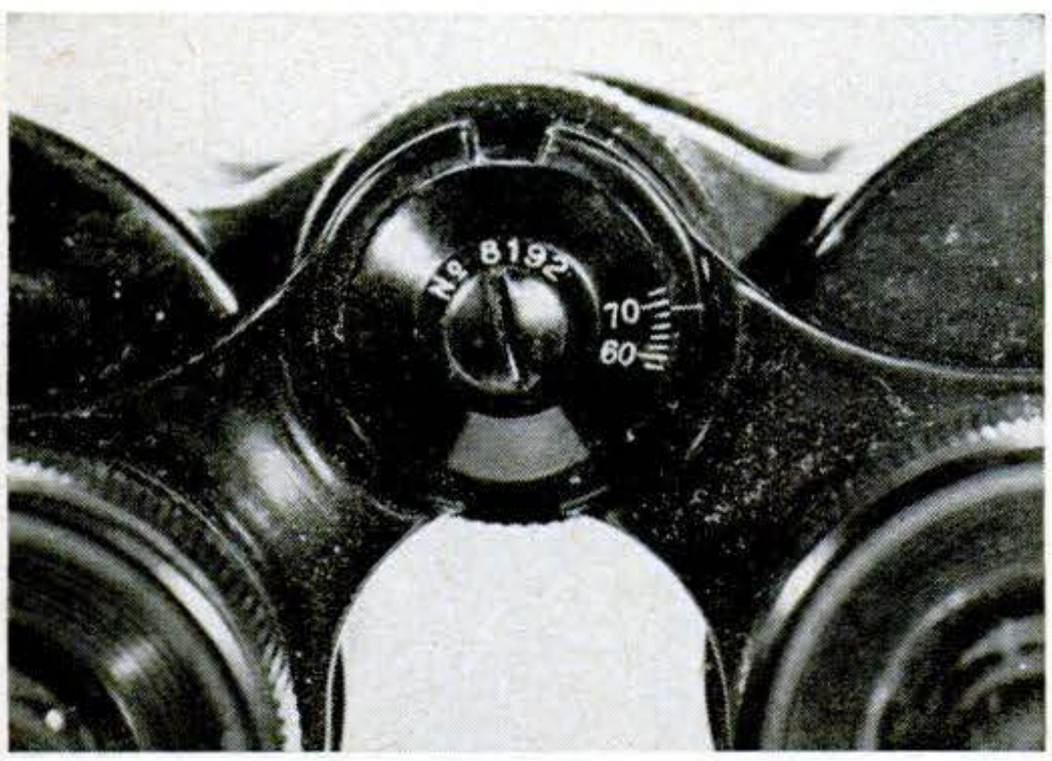
WHAT is your hobby—baseball, football, camping, sailing, hunting, fishing? Do you go in for scenic tours, bird study, mineral collecting, the opera? If you do any of these things, you'll enjoy them more with the eagle-eye vision that only binoculars can give you.

With binoculars, the hunter stares his prey in the eye—from a safe distance. Sports

Copyrighted material



ALL BINOCULARS, however focused later, are first focused for one eye at a time. Hand covers one lens. Shutting one eye would strain the other and give an incorrect focus.



HINGE permits adjusting distance between barrels to match the user's eyes. Scale shows setting. Telltale sign of quality is smooth action of hinge, the first thing an expert notes.

fans sit on top of every play. Rockhounds can inspect cliffs for mineral outcrops from afar. Hikers can pick the best camp site within wide range; canoeists, the best portage. Natural wonders are brought near for sight-seers.

What should you know, if you're buying binoculars? Here are the ABC's and some inside stuff, too.

Binoculars, like field glasses, are essentially a pair of telescopes. But the straight barrels of field glasses would become overlong and unwieldy for greater magnification than about four times. So binoculars have reflecting prisms, which provide a zigzag optical path of the needed length within a compact and readily portable instrument.

Binoculars bear numerals like 7X, 35 or 8X, 25. The first number tells the magnifying power: 7X means that the glasses magnify seven times. For all-around use, that power is ample. It makes a quarter-mile-distant object look less than 200 feet away. And glasses of 7X power can be held comfortably steady.

Is high power desirable? An average user may find greater magnifying power an expensive mistake. The view won't hold still when high-power glasses are held in the hand—at 10X, even the heartbeat makes it dance. Such glasses need a rest or support, which may not always be at hand, or convenient to lug around in the field. What extreme magnifying power would cost can be invested much more wisely, and rewardingly, in other optical qualities such as superior definition—of which, more later.

The second number on binoculars concerns the brightness of the view they give. It tells the diameter of the objective lens, the lens opposite the eyepiece, in millimeters. Divide it by the magnifying power, and you have the diameter of the light beam reaching the eye—five mm. for 6X, 30 glasses. The larger the beam, the brighter the image, within limits set by the capacity of the human eye. For in bright daylight, the pupil of the eye normally contracts to about three mm. (about ⅛ of an inch) in diameter, and can admit only that much of a wider light beam, although it enlarges considerably at night.

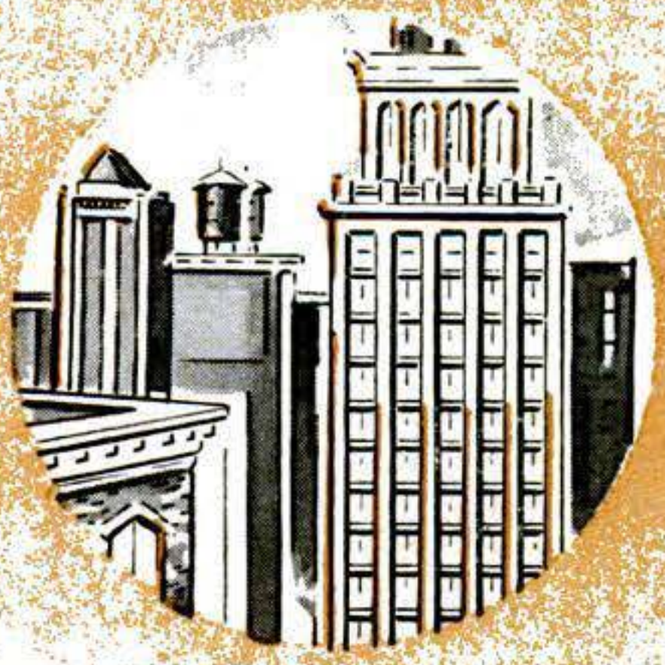
This means that in daytime a 6X, 15 or 8X, 25 glass approaches or equals the maximum brightness possible, making it fully adequate for sports or scenery. The popular 7X, 35 model offers a generous reserve of brightness at dawn or dusk, as well as ideal daytime seeing.

Few if any landlubbers would ever need the 7X, 50, which the Navy calls a "night glass," and whose big objectives pay off only after dark.

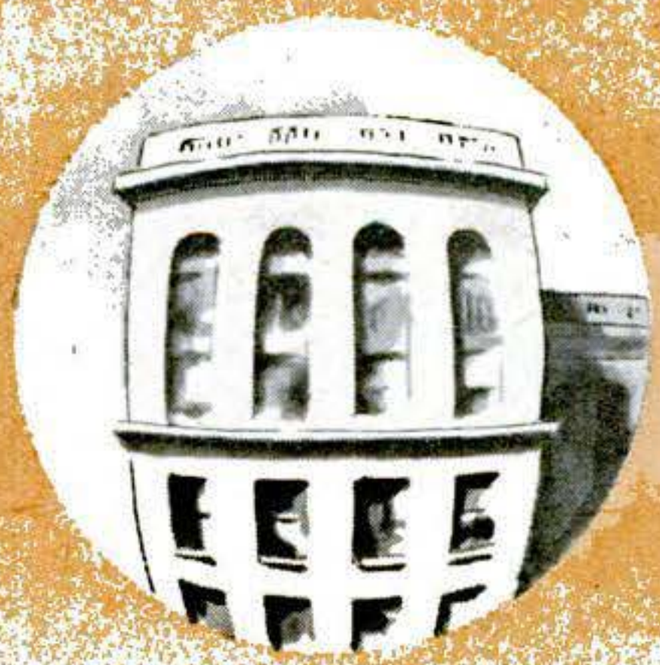
Which type? Binoculars come in two styles, central-focusing and individual-focusing, by one and two adjustments respectively. For close-up subjects, requiring frequent change of focus, central focusing is the more convenient. But users whose objects of interest are all beyond 100-foot range will never need to change focus. They may prefer individual-focusing glasses, whose only moving parts, the closely threaded eyepieces, are better proof against dust and

Copyrighted material

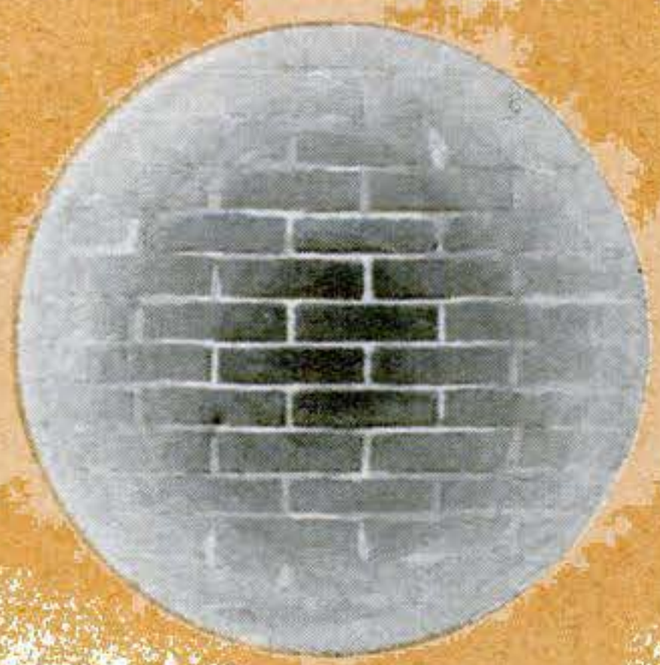
These Tips Will Help a Novice to Judge Binoculars' Quality



LOOK FOR COLOR FRINGES along buildings' edges. Prominent color bands detract from sharp definition by fusing details together, and indicate inferior optical workmanship.



ARE STRAIGHT LINES badly distorted, especially near edge of field? (For clarity, effect is greatly exaggerated above.) Glasses of the best quality show the least distortion.



FOCUS SHOULD BE SHARP over whole field at once. Through inferior glasses, a brick wall may look like this: when the bricks at center are sharply in focus, the others are fuzzy.

moisture. This type is always specified for military use.

Suppose you decide you want 7X, 35 central-focusing glasses, just for example. The story doesn't end there. For a dealer may show you five to 20 pairs, ranging in price from $35 to nearly $200. They're a cross section of some 150 makes currently being offered, which vary even more extremely in quality than in price.

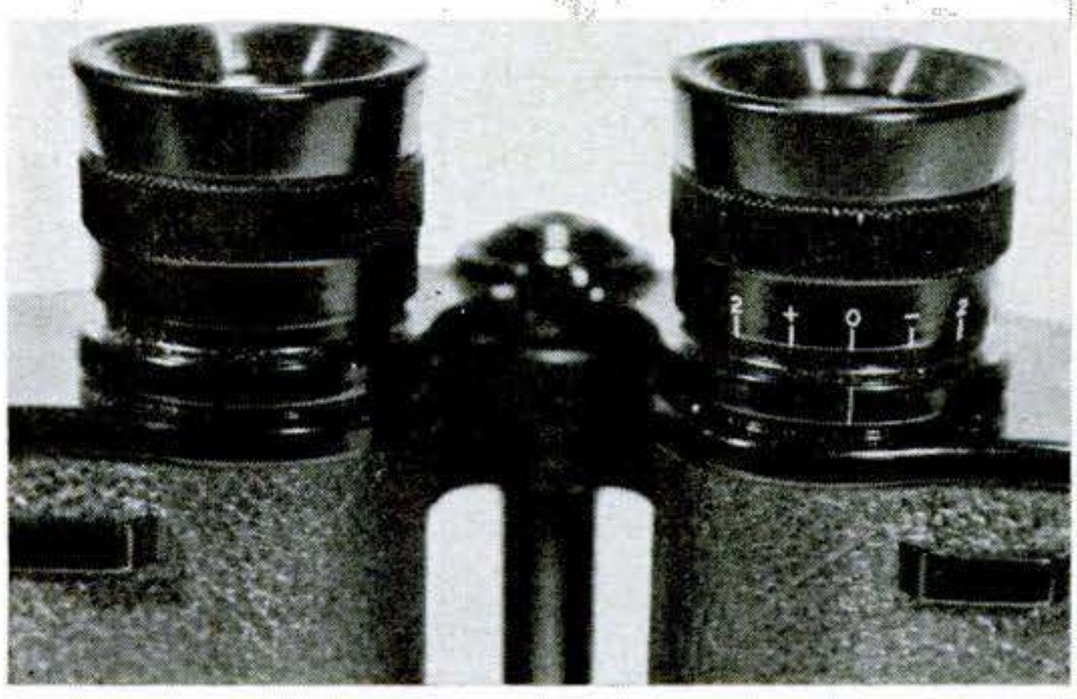
Among these are well-known names, in themselves an assurance of reliable quality: Bausch & Lomb, Leitz, Hensholdt, Bushnell, Swift & Anderson, Wollensak. Far more numerous and often "bargain-priced" are unfamiliar makes, of which many appear suddenly on the market, and as suddenly vanish.

Outwardly all look alike. Even when you look through them, you may not see at once why one pair is better than another. If you ask the dealer and he shrugs and says, "You get what you pay for," you're still in the dark.

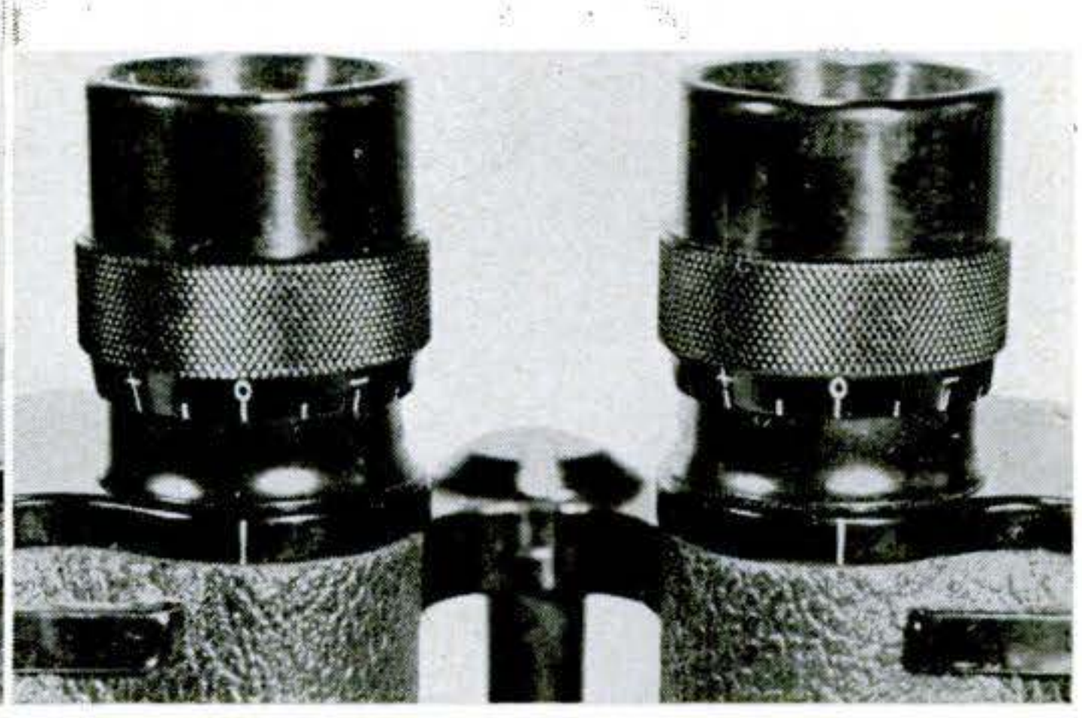
How can a novice judge the quality of binoculars he is offered, right in the dealer's shop? Here is an expert's advice on a number of ways to do it.

A test for distortion is simple to make. Focus the glasses on a building, telephone pole or steeple not far away, and bring its straight edge near the border of your field of view. Is the straight line badly curved, in or out? All glasses show some distortion of this kind; however, the best binoculars minimize it.

Look for color fringes, by sighting toward a building silhouetted against the



TWO STYLES OF FOCUSING offer choice. Central focusing, handier for frequent changes, uses center knob. One eyepiece is adjustable, for difference in eye strength.



EYEPIECES are independently adjustable in the glasses above, with no other focusing mechanism. Military users and others like their resistance to dust and moisture.

Copyrighted material

sky. A conspicuous band of color along its edge isn't good. Most prominent in inferior glasses, color fringes surround details of an image and fuse them together, impairing definition.

Is focus evenly sharp? Point the glasses at a brick wall, near enough to distinguish the individual bricks. When bricks at the center of the field are sharply focused, are the ones at the edge of the field badly blurred—or vice versa? This lack of uniform focus, called "curvature of the field," means that only part of the view can be seen well. Better glasses give you the benefit of their whole width of field.

How good is the definition? To compare different glasses *of the same magnifying power,* prop up or pin up a page of a newspaper—and see from how far away you can read fine print with each glass in turn. You can best do this sitting, turned around, in a chair and resting your elbows on its back to steady the glasses. Mark the position of the chair after each trial.

The best glasses, of course, are the ones that make the print legible at the greatest distance. While this is only a rough-and-ready test, it should show up any marked differences in quality.

Binoculars could meet these optical tests and still be worthless junk, without good workmanship elsewhere.

Flimsy glasses prove no bargain. Take alignment, or "collimation" as technical people call it. Naturally the binoculars' twin telescopes must point in the same direction. A slight misalignment would strain the eyes, and a really serious one would be intolerable.

Now, there's no reason why any new binoculars, no matter how poorly made, shouldn't be in good alignment—a factory adjustment of objectives or prisms does it. Whether they'll *stay* aligned, despite the bumps that glasses get in ordinary service, is something else again.

To play havoc with alignment, any one of the four prisms needs to move only half a thousandth of an inch. Lightweight but firm metal mountings for prisms call for craftsmanship of a high order. The maker of fine glasses is justly proud to be able to say that nothing short of wrecking them can disturb their alignment—and back it up, as does Bausch & Lomb, with a factory guarantee.

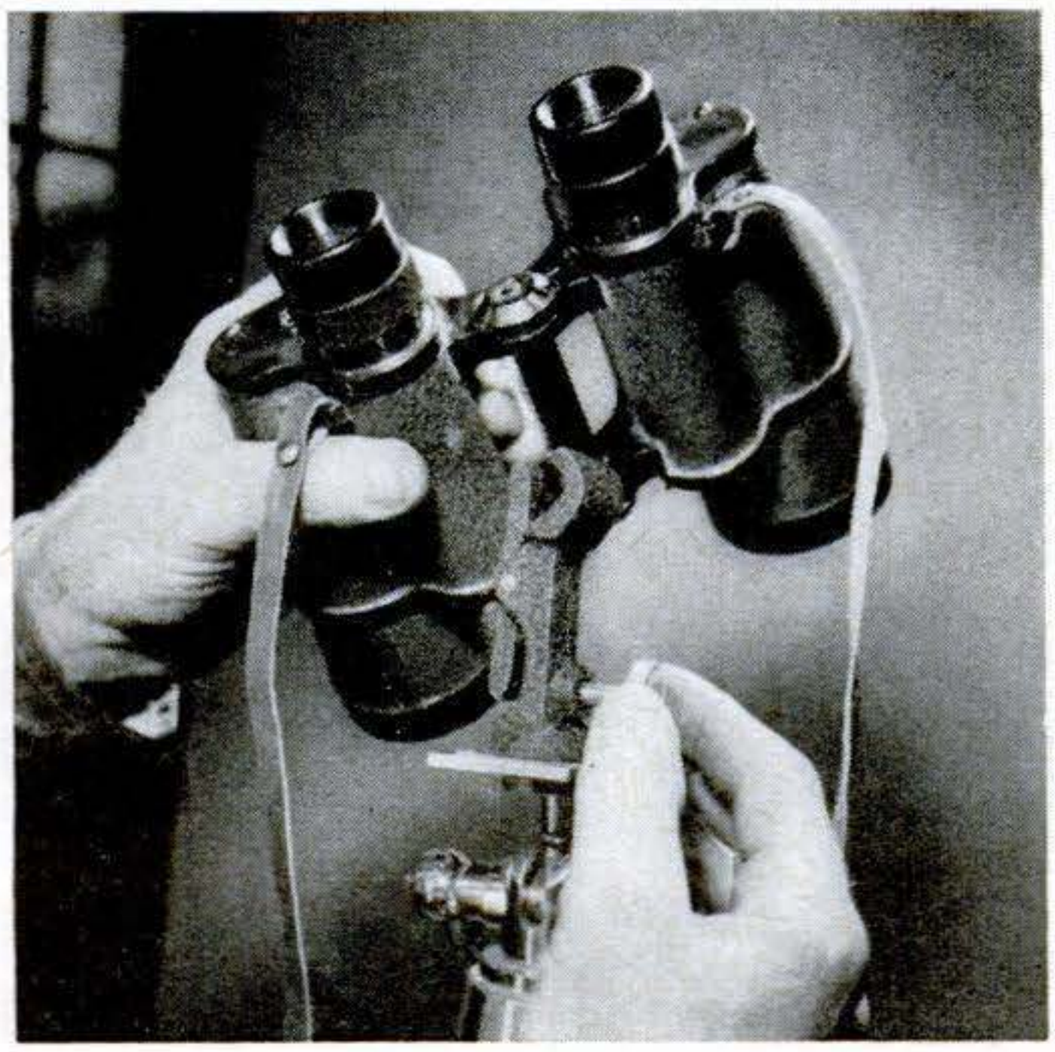
A "bargain" pair may prove no bargain after all if repairs cost you $7.50 to $25 each time it goes out of alignment, as can happen again and again, for no repairman can cure faulty or flimsy construction.

Are there ways you can detect poor workmanship? After all, no dealer will let you give the binoculars in his case the Army and Navy Shock Test. But there are some telltale signs to guide you.

Feel the hinge action—as an expert does, first thing, when he's handed a pair for inspection. To match a user's eye width, the barrels swing on the hinge. It should yield smoothly to pressure and hold firmly when released. So should all focusing adjustments. Binding or looseness bares sloppy

[Continued on page 254]

Tripod Adapter for Powerful Binoculars Gives User Steady View

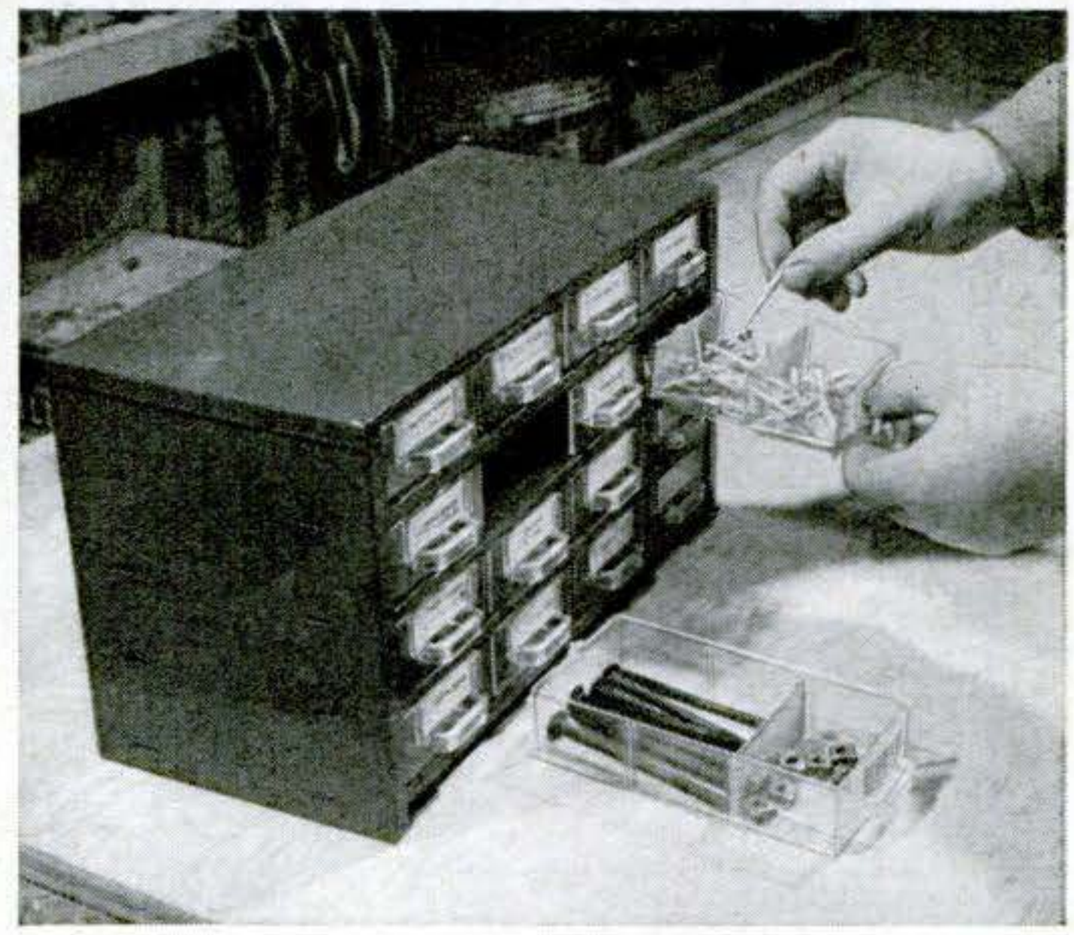


BEYOND a magnifying power of about seven times, as explained in the article above, binoculars become hard to hold steadily enough in the hand for satisfactory viewing, and a support is needed. For those who nevertheless want glasses of extreme magnifying power, or have them already, this newly devised clamp should prove a useful aid.

The accessory adapts any standard camera tripod to serve as a steady support for binoculars. When the base of the clamp has been engaged by the tripod screw as shown, the glasses are inserted in it, and a thumbscrew tightens jaws that grip them securely. Designed to be sold for $3.50, the adapter will be introduced by the Mackson Instrument Co., Ridgewood, N. J.

Copyrighted material

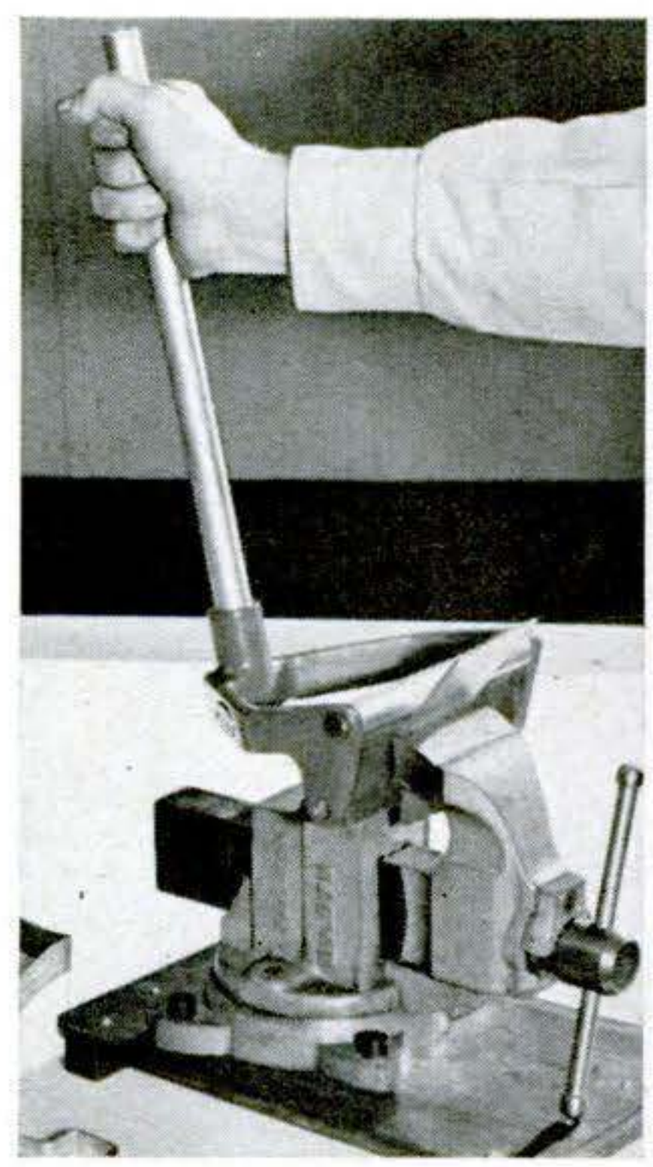
New Tools

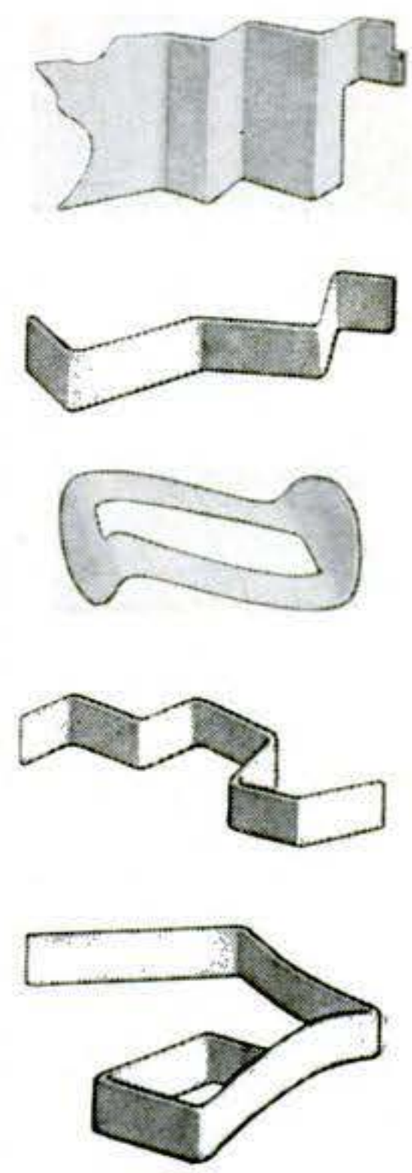


1. Sander Clamps on Motor. Bolted directly to the motor housing, this portable belt sander eliminates drive belts and pulleys and can be moved quickly from job to job for use without bolting down. The lower wheel mounts on the motor shaft, and the upper one rides on an adjustable spring that keeps tension tight on belts from 42″ to 46″ long and up to 1″ wide. It has a removable table and backing plate and swings out of the way when not in use.

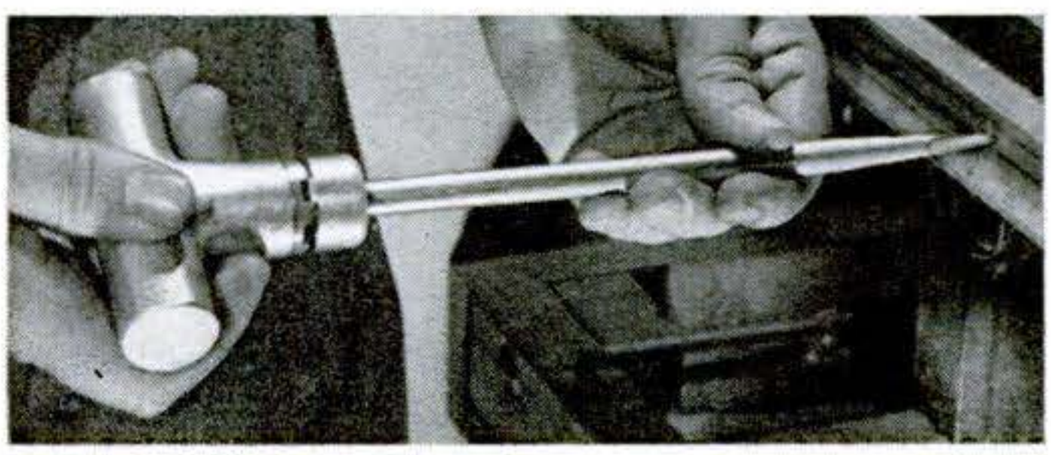
2. Cabinet Stores Small Parts. You can set up your own filing system for screws, bolts and other small parts with this versatile storage cabinet. Clear-plastic drawers let you see what you've got, or they can be marked with labels that slip in small slots on the front. Slots on the inside of the drawers let you drop in dividers to suit different-size parts. The cabinets can be hung on a wall and come with 16, 24, 32 or 48 drawers.

3. Bending Brake Mounts on Vise. Clamp the inexpensive bending tool (at right) in a vise, pull the lever, and the pivoted roller will put a clean, sharp crease in metal. To bend a radius, a piece of round stock is slipped under the metal. The tool will bend light sheet up to the jaw width and narrow strips up to 3/16″ thick.





4. Screwdriver Has Clutch Handle. You can get a real twist on the T-shaped screwdriver (below). The pivoted handle has a six-position, clutchlike drive that lets you turn the blade without changing your grip. A spring holds the tip in the screw as you back off the handle to take another bite.

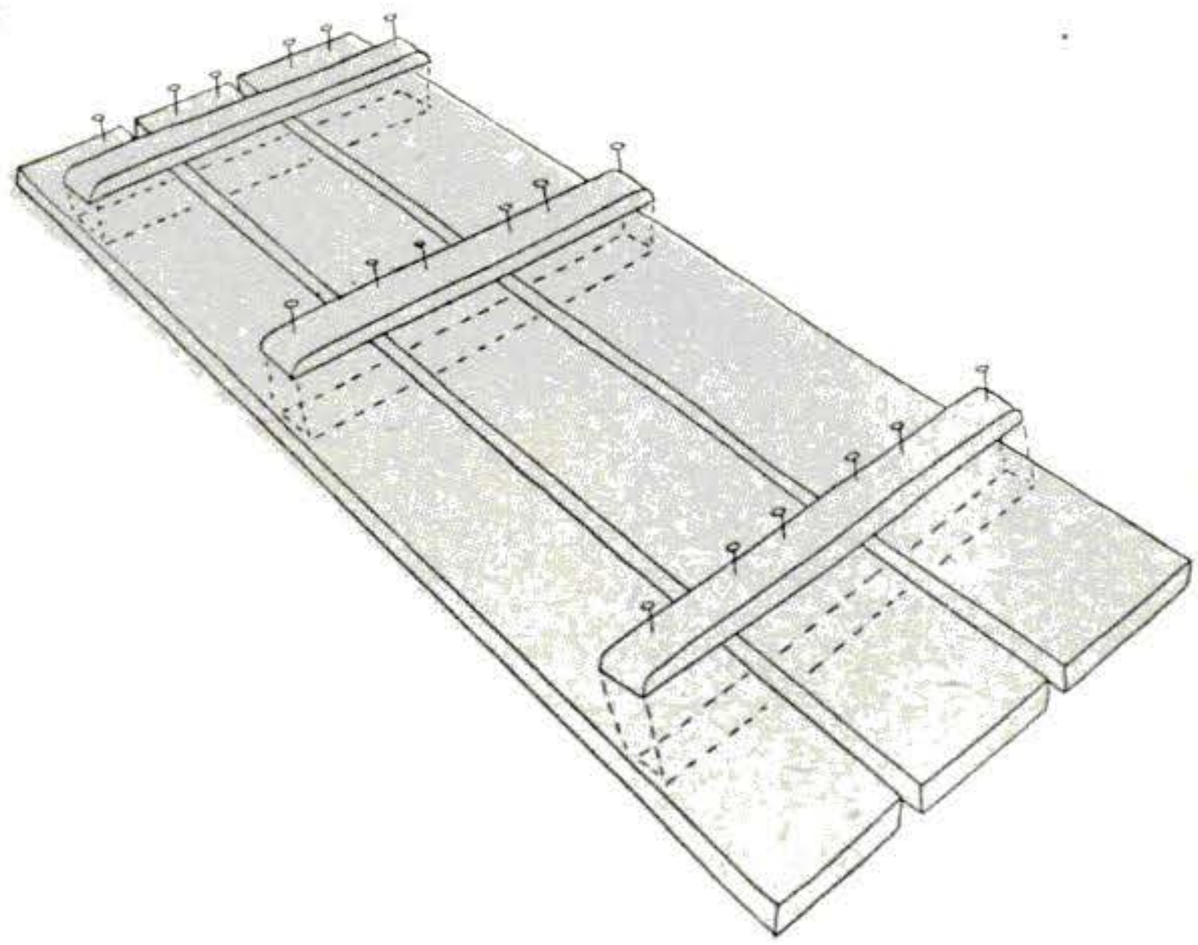


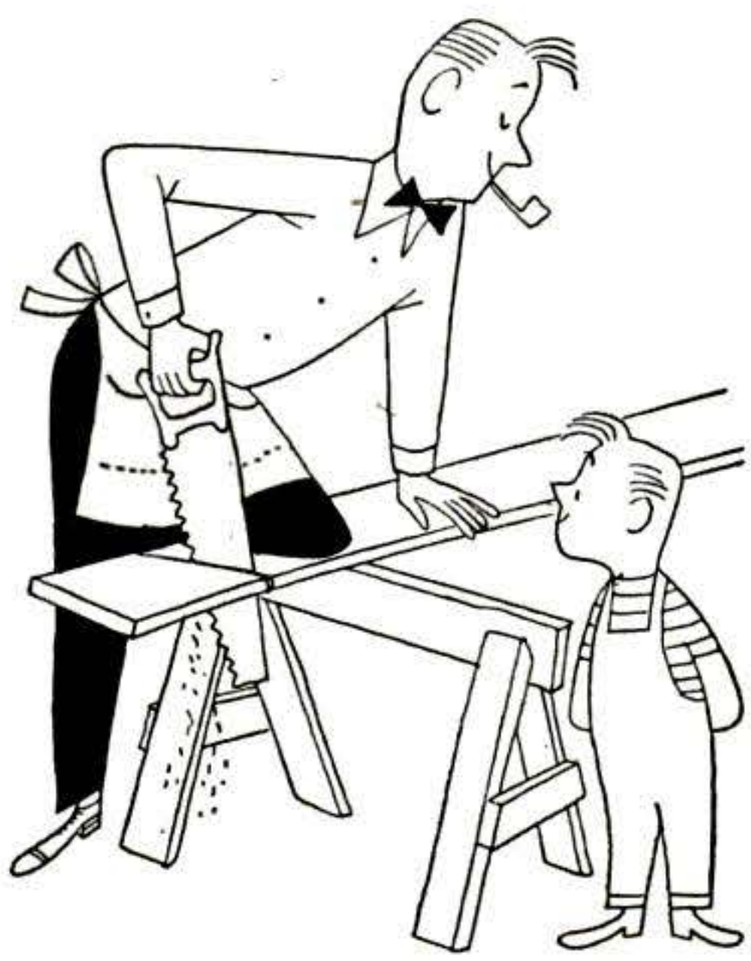
Further information on the tools described on this page can be obtained from: 1. John P. Fox Co., 5514 York Blvd., Los Angeles 42; 2. Fidelity Products Co., 2817 3rd St., N. W., Canton 8, Ohio; 3. Lund Mfg. Co., Biddeford, Me.; 4. J & L Tool Co., P.O. Box 82, Three Rivers, Mich.

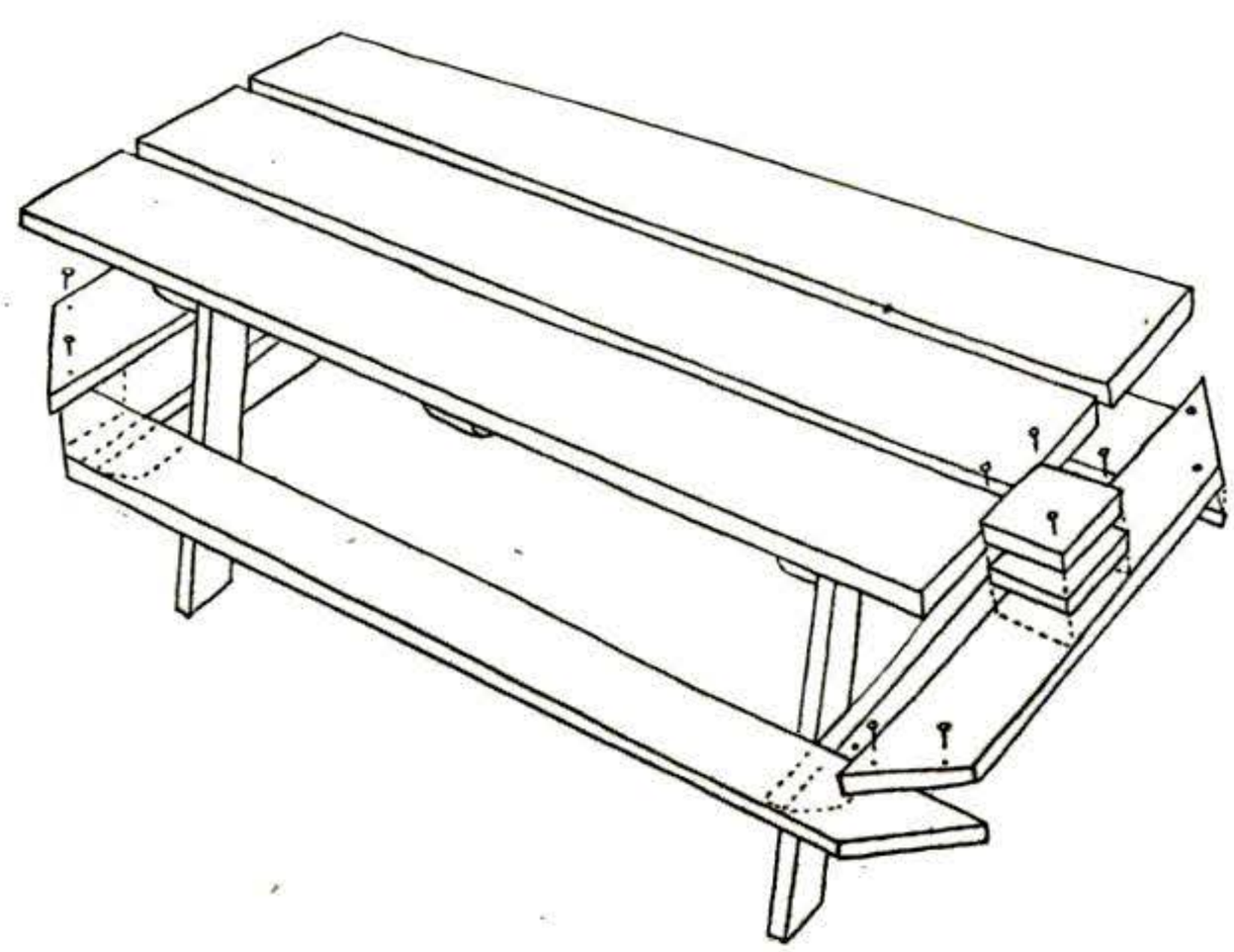
Copyrighted material

By Roy Doty and Darrell Huff

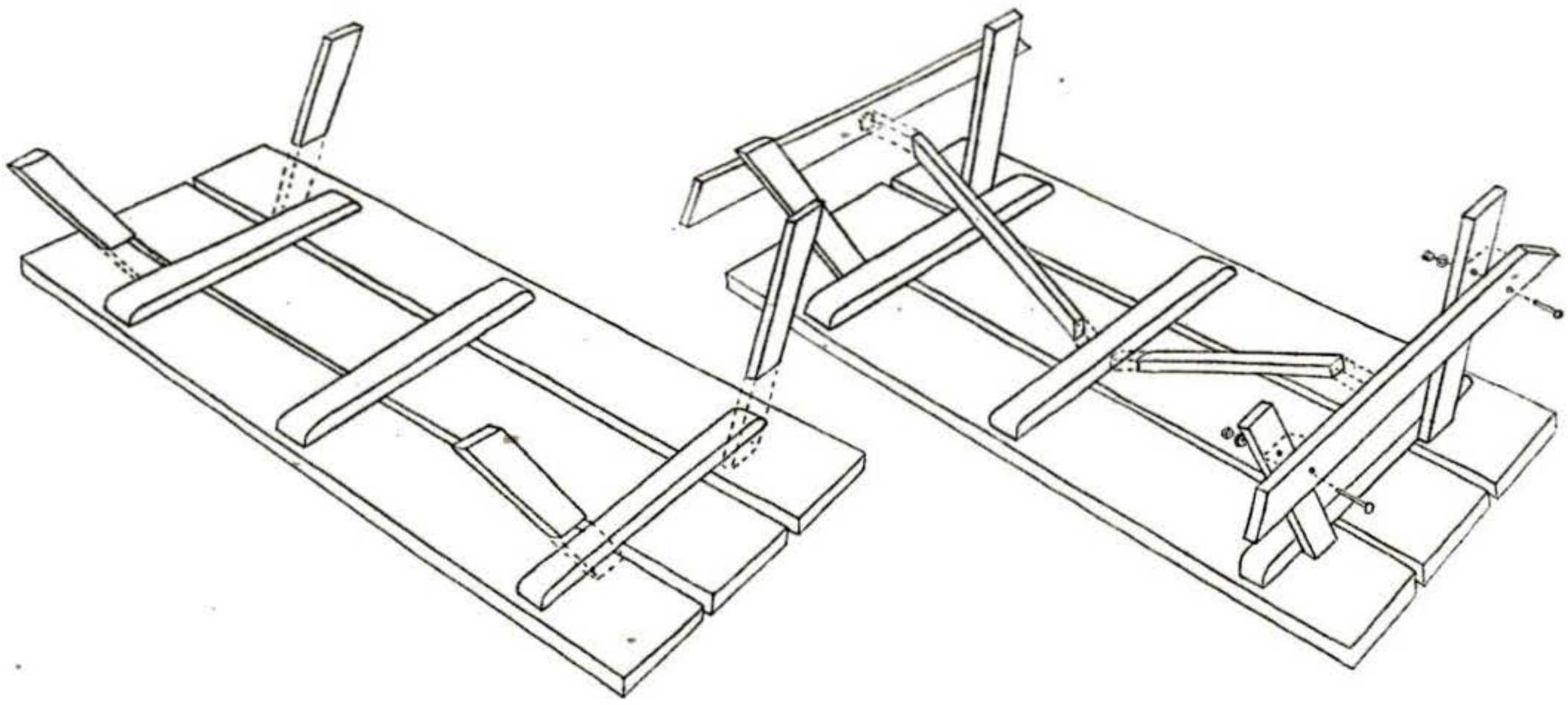
Wordless Workshop

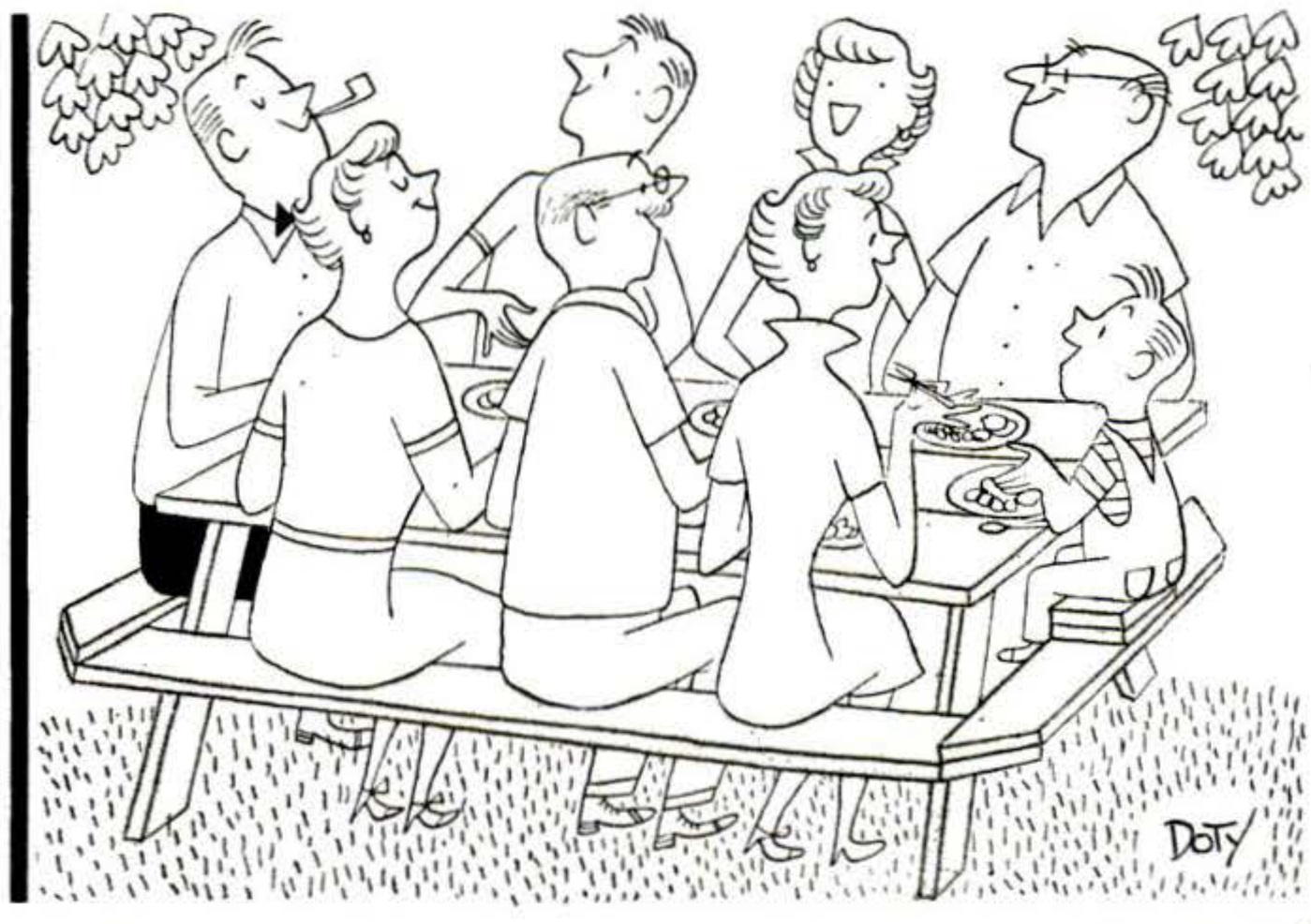






Copyrighted material



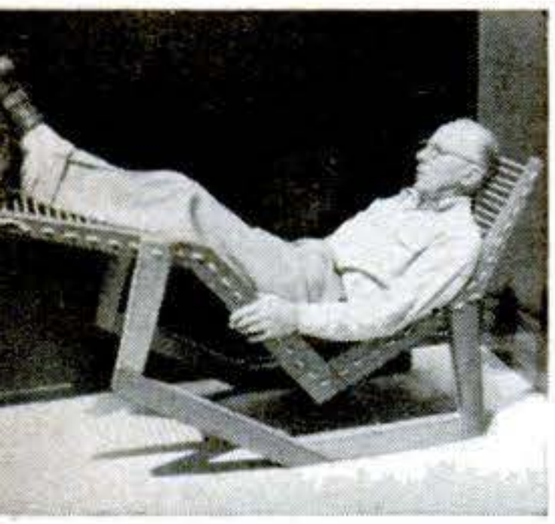


Next Month: A single circle of wood makes a tricky plant stand.

Copyrighted material

Sit up to loll . . .

How to Build a Two-Way Lawn Chair



. . . lie back to relax.

By Darrell Huff

WANT a "chaise longue" that lets you sit up (sort of) or lie back (sort of) —neither, really—and is the essence of comfort? It's yours for the price of a little lumber, three hanks of clothesline and a minimum of effort.

You can use it indoors or on the lawn, porch or terrace. Leave it as it is, or upholster it. If you like, add a foam-rubber pad. In place of springs or the customary webbing, you use plastic clothesline, durable and inexpensive.

Pine's fine for a piece like this. The one described on these pages was built of redwood for its handsome color and resistance to weathering.

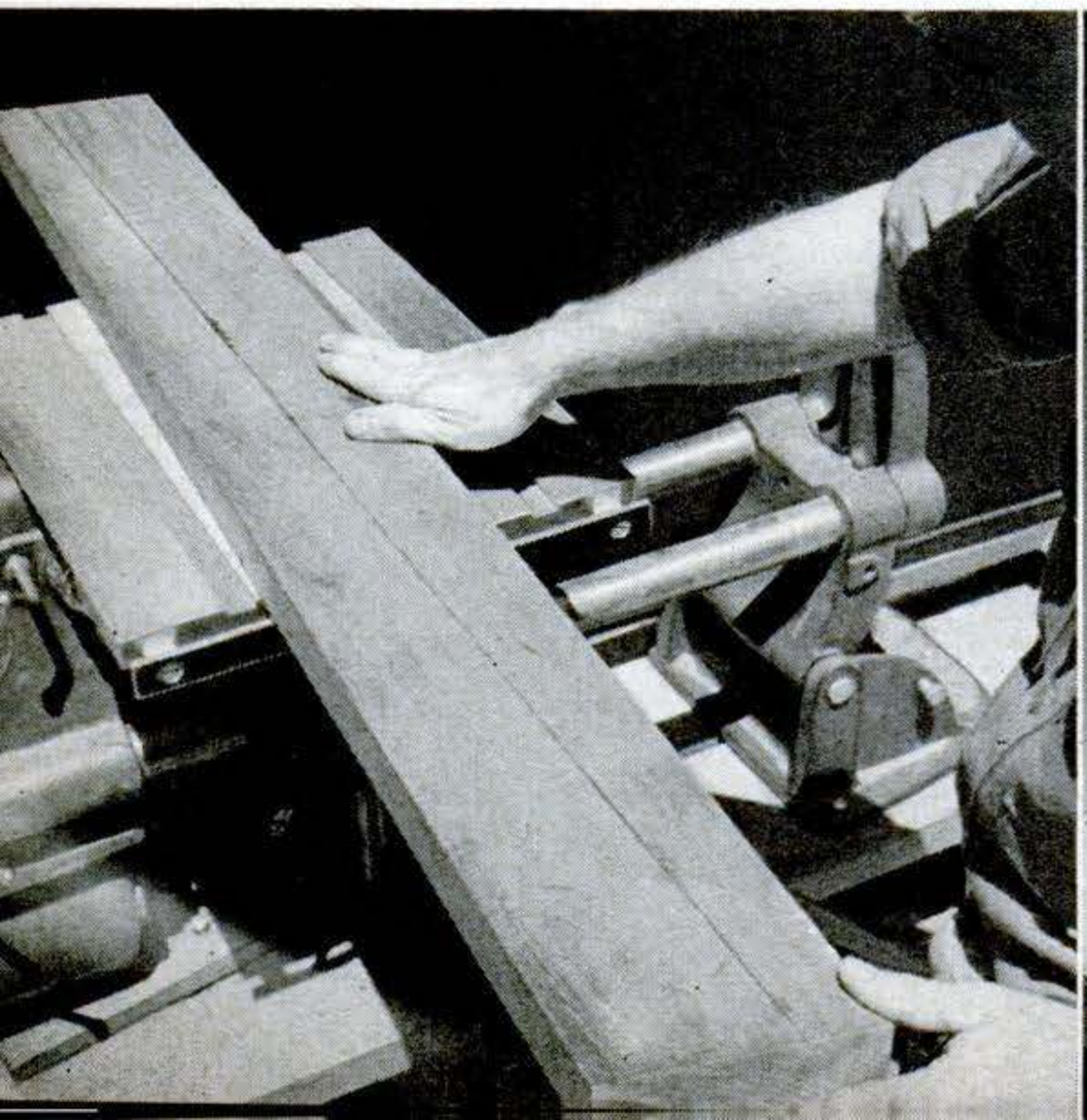
The lumber needed is 14′ 4″ of stock 1¾″ thick and 5¾″ wide. This is bought most easily as two two-by-sixes 8′ long. If you prefer a hardwood, a thickness of 1¼″ to 1½″ will do.

For pine, you will need oval- or round-head screws in two sizes—42 No. 8's 1½″ long and eight No. 12's 2¼″ long. You will also need eight No. 8 flathead screws 1½″ long. Temporary assembly will require three dozen extras of this size.

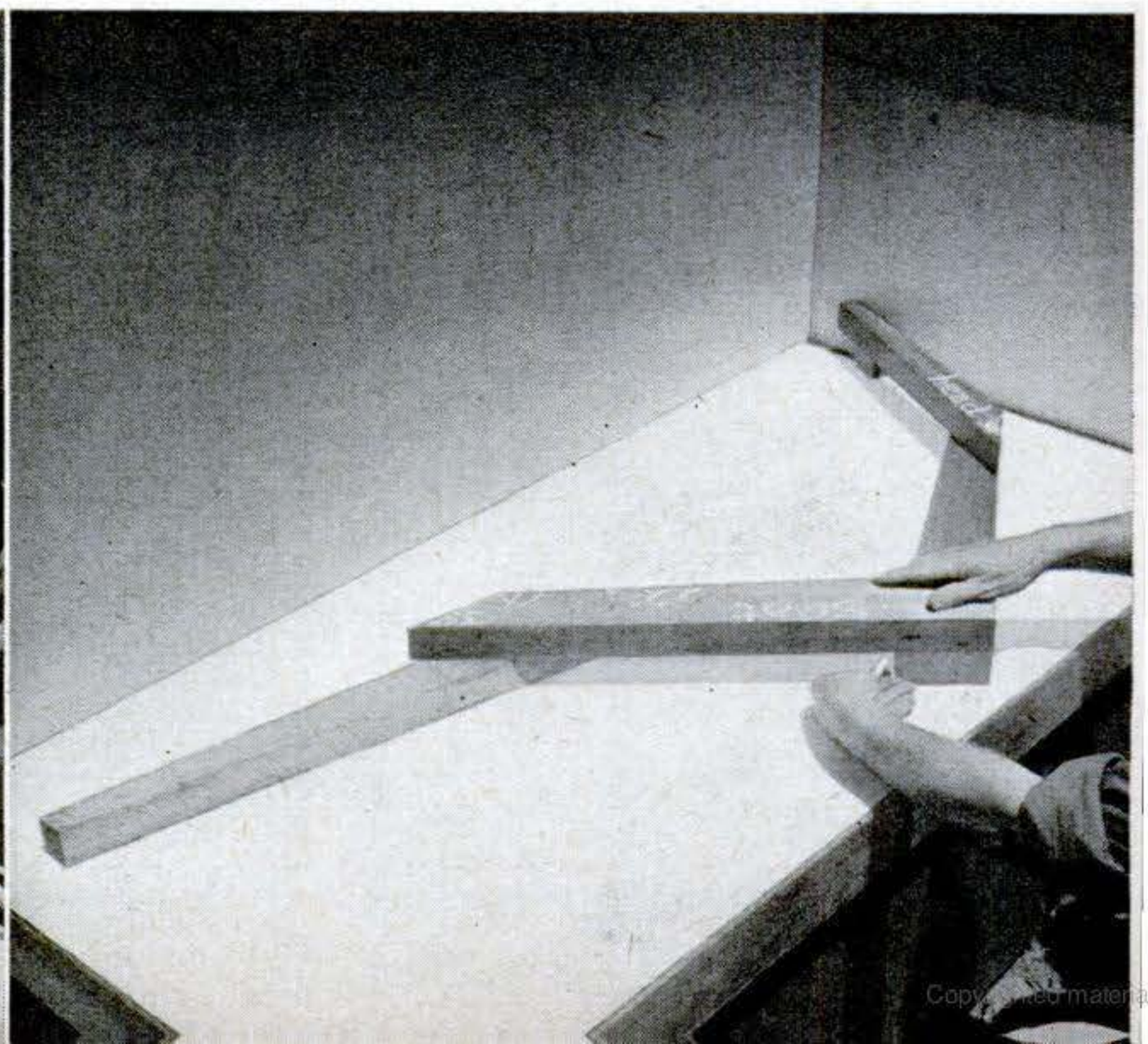
Finally, scrounge around your workshop for a scrap of one-by-ten clean board that is at least 19¼″ long.

Be sure the hanks of clothesline are connected. You should have at least 125 unbroken feet of line.

MAKE ALL CUTOFFS first (see diagram on facing page), then angle-cuts and taper-rips. Jig would simplify freehand taper pictured here. Make cuts for one side of chair reverse of other side, of course. Lumber needed for this chair can be hauled in a car.

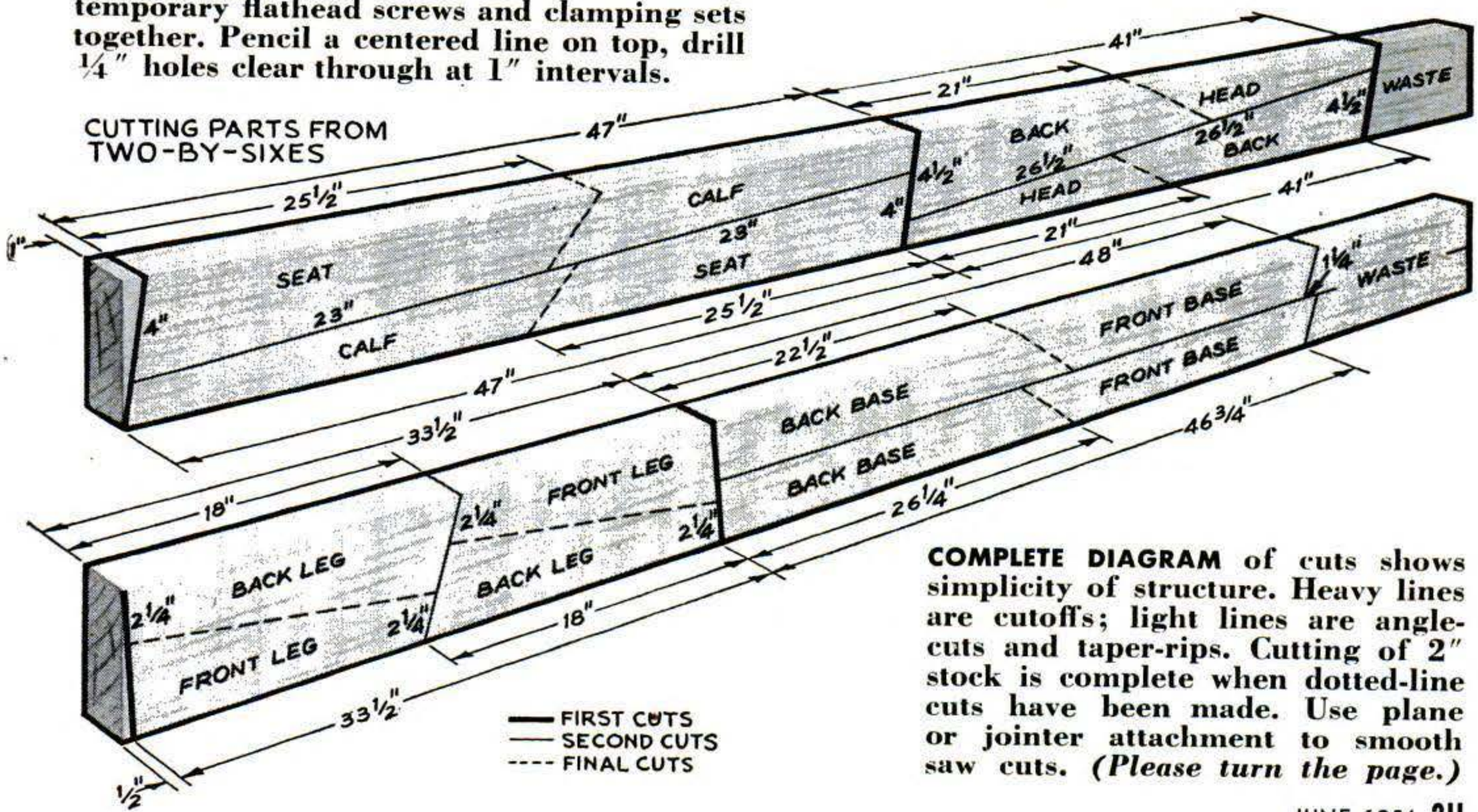


LAP JOINTS are made easiest by laying the pieces out on the bench for marking. Here, in order left to right, are the calf, seat, back and head. Draw lines for the joints on both pieces at each lap. It's a good idea to chalk names on all parts for quick identification.



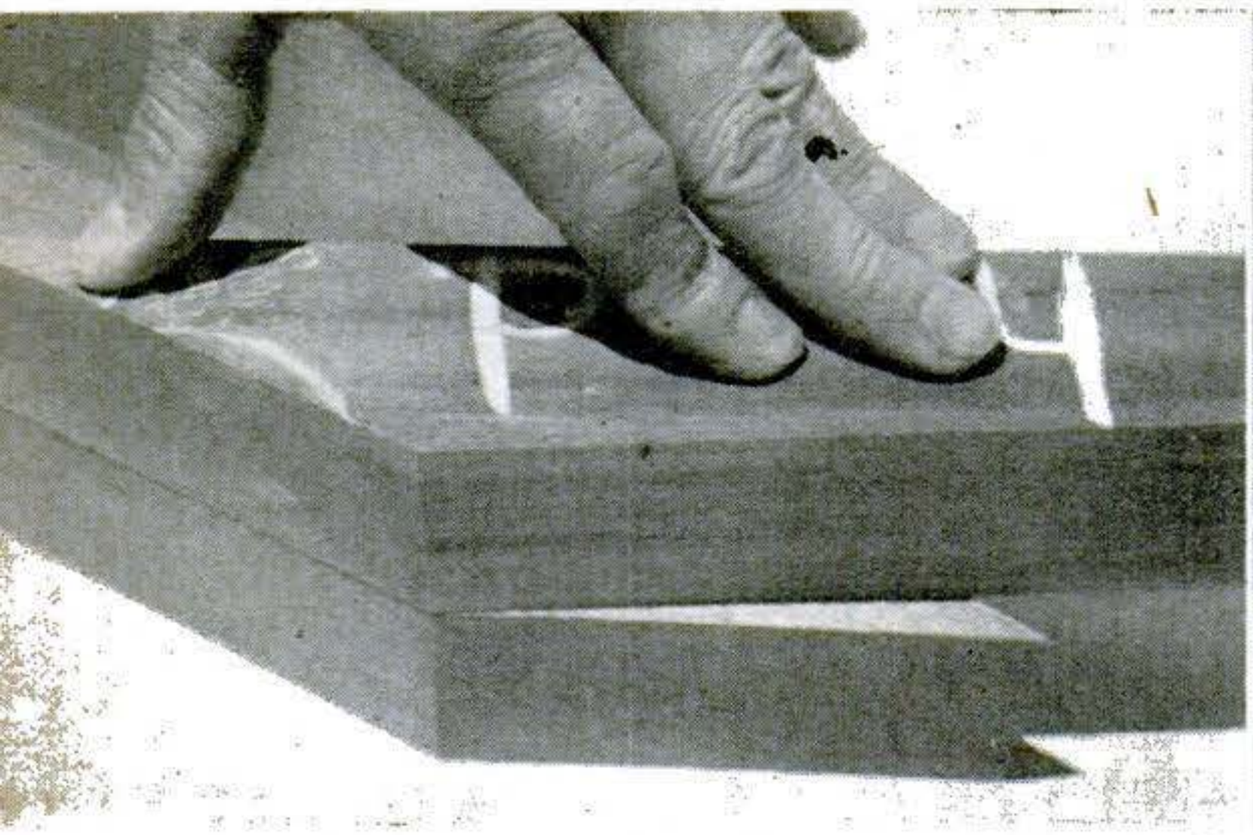
Copyrighted material

ASSEMBLE BOTH SETS of four pieces, using temporary flathead screws and clamping sets together. Pencil a centered line on top, drill ¼″ holes clear through at 1″ intervals.

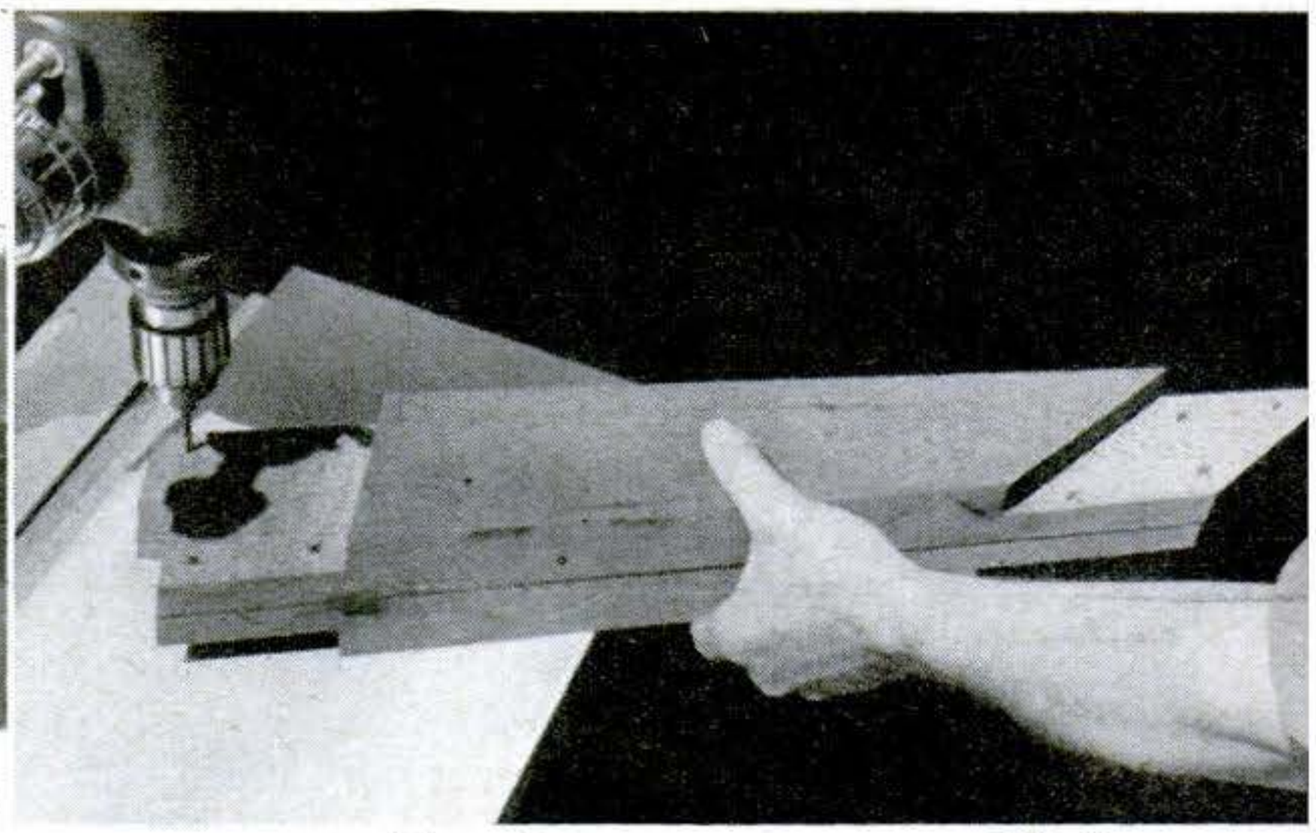


COMPLETE DIAGRAM of cuts shows simplicity of structure. Heavy lines are cutoffs; light lines are angle-cuts and taper-rips. Cutting of 2″ stock is complete when dotted-line cuts have been made. Use plane or jointer attachment to smooth saw cuts. *(Please turn the page.)*

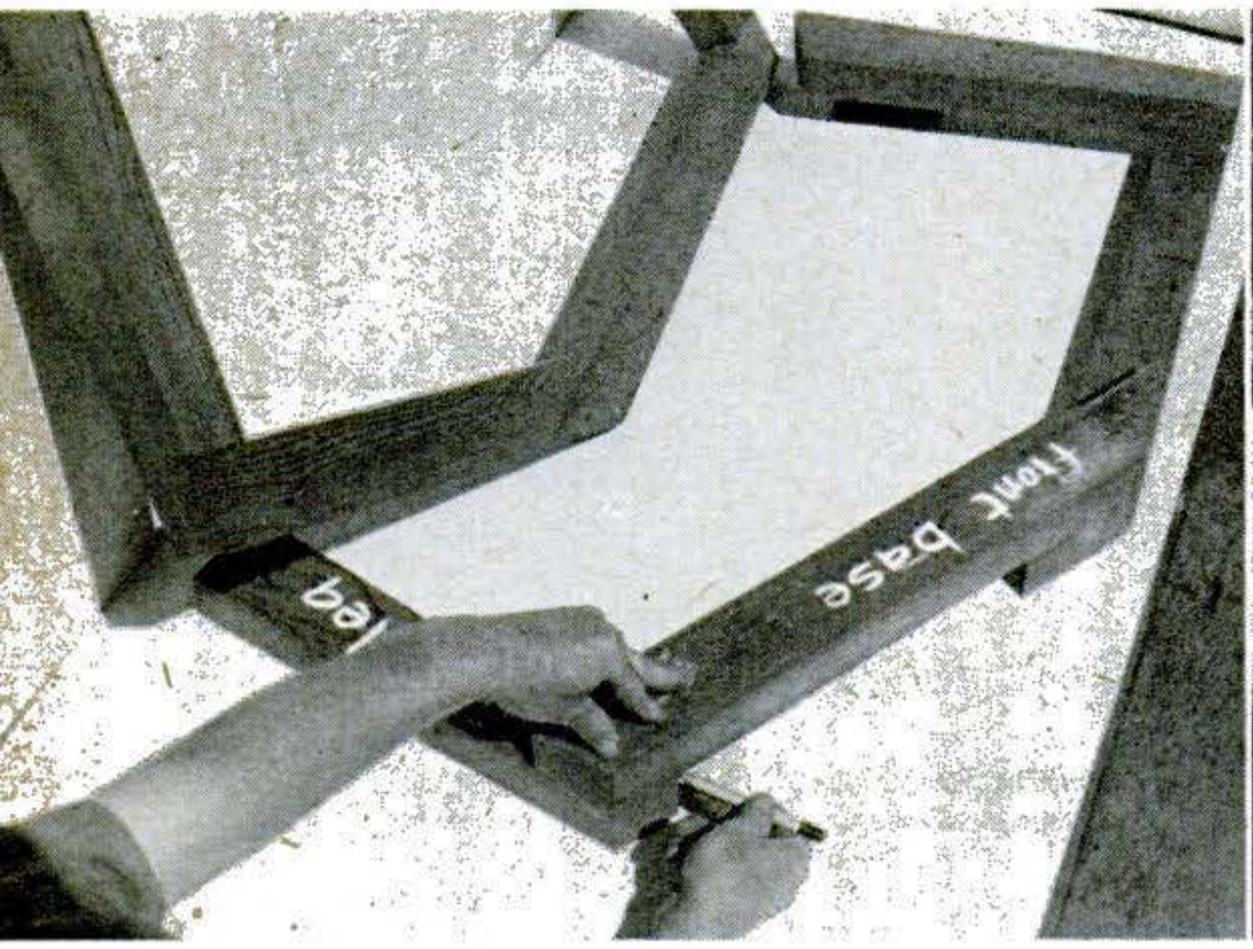
Copyrighted material



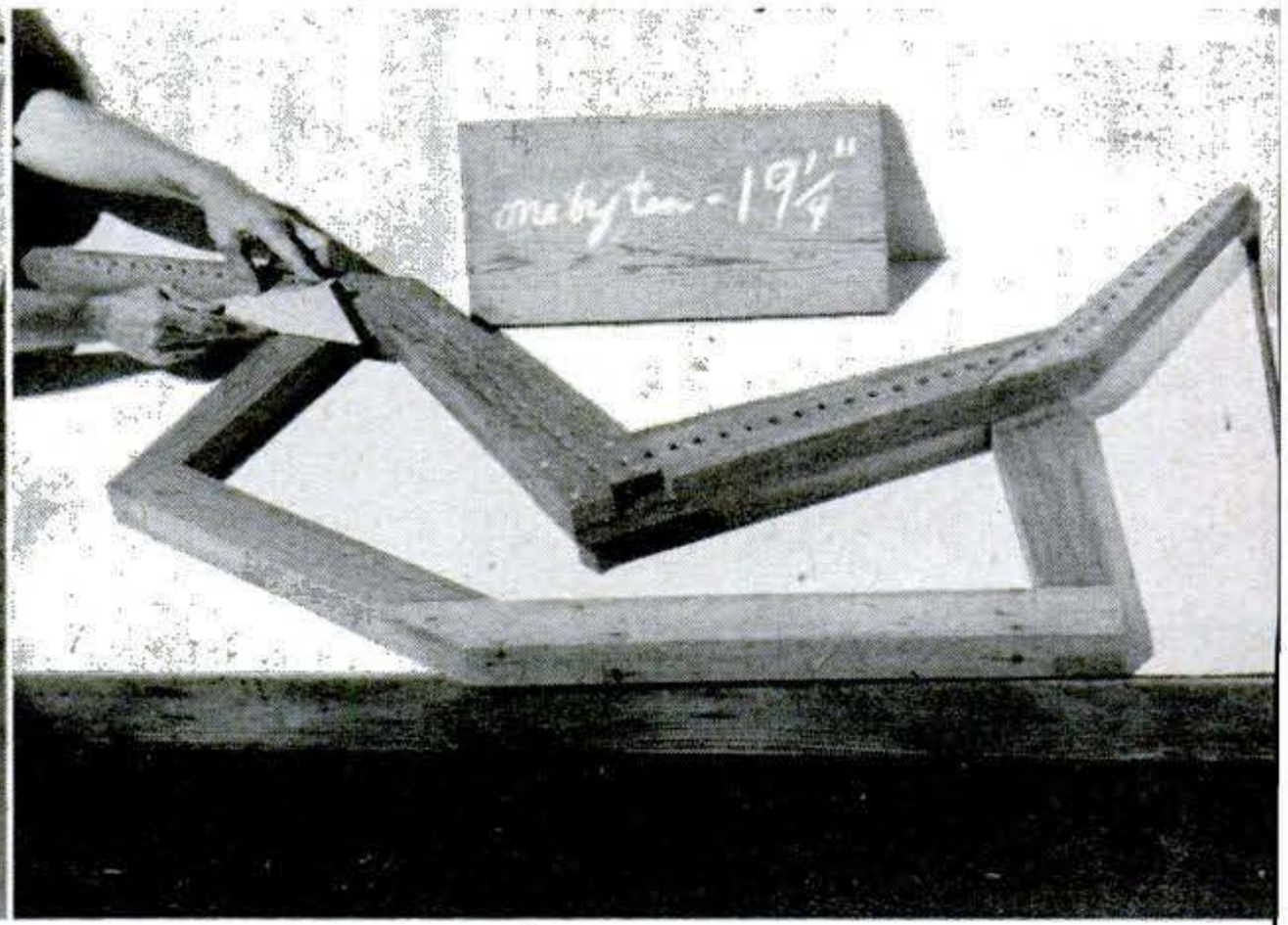
AS THIS CLOSE-UP SHOWS, some joints won't be perfect laps. Just make sure that corners line up. Excess wood sticking out in dog ear can be trimmed off after assembly.



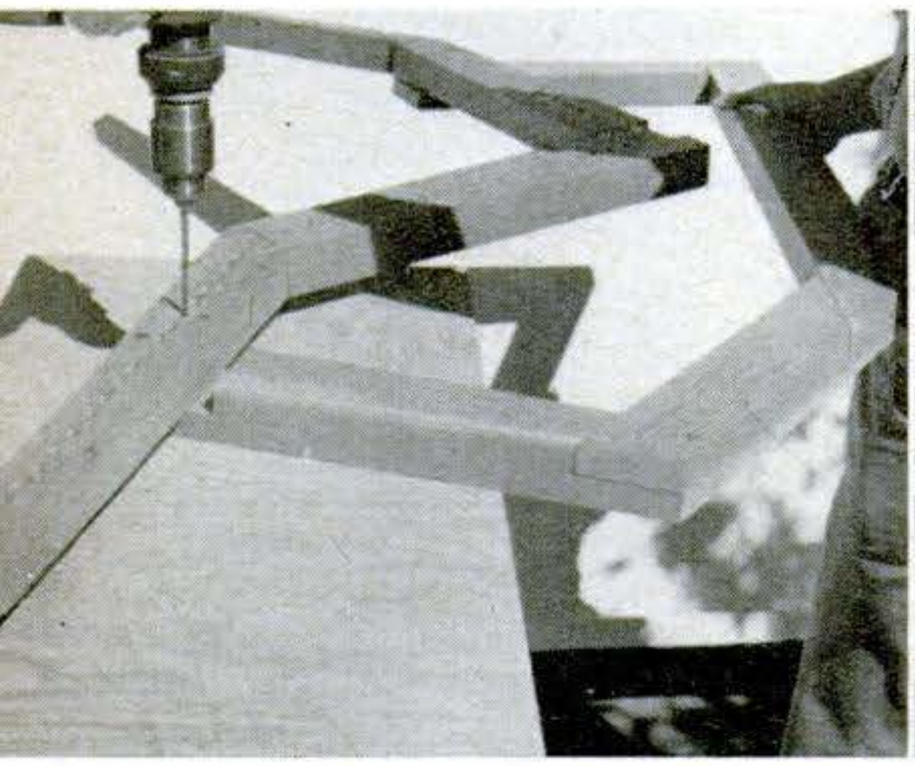
DRILL HOLES like this to take your 1½" screws. Drill four holes at each end of the seat pieces and at the fat ends of the head pieces. Your stock, of course, should be dry.



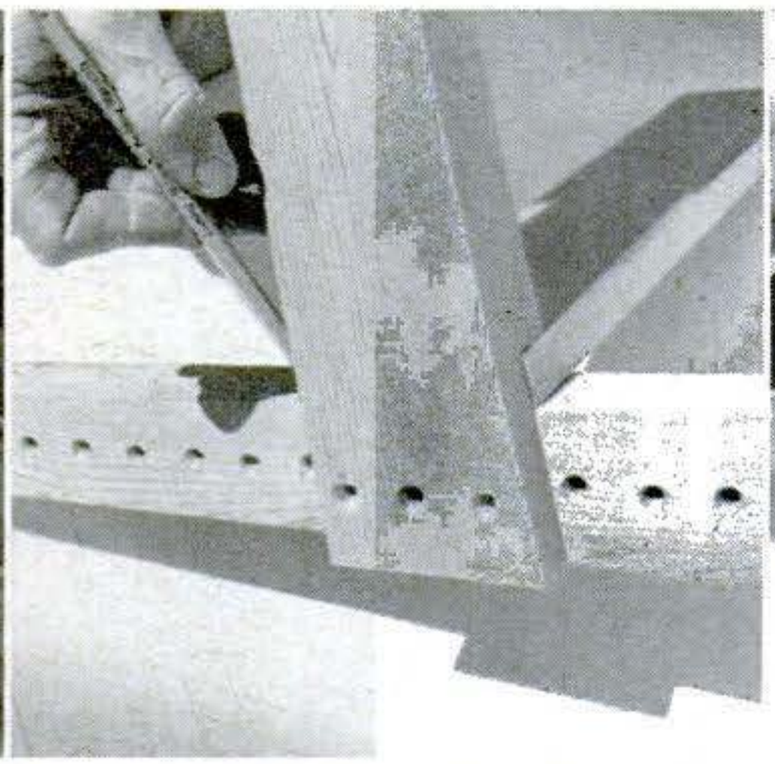
NOW ASSEMBLE leg and base pieces. Make one set reverse of other, as with first assembly. Mark and cut lap joints and dry-assemble with flathead screws at the joints.



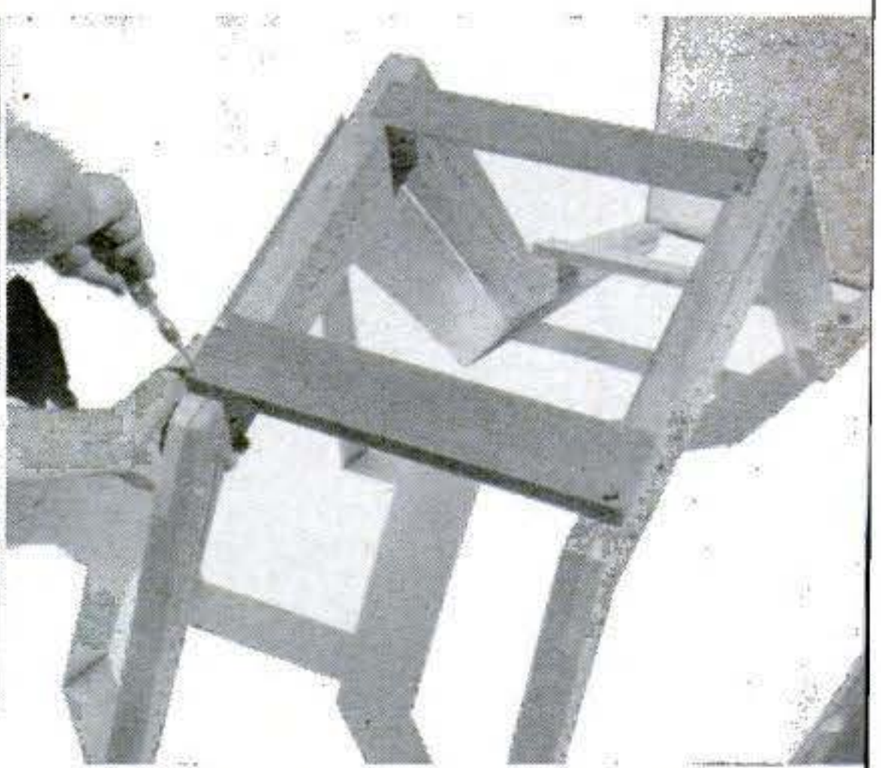
LAY OUT one assembly of each kind this way, screwheads up, with back legs at head end of main assembly. Mark lines for cuts and saw lap joints half-through both legs.



WITH JOINTS COMPLETE, reassemble unit, using pair of long screws at each joint. Wherever ¼" holes are blocked by an undrilled leg, drill the holes on through.



CUT ONE-BY-TEN to length of 19¼", rip to fit back-leg notches. Mark position of stretcher pieces on main assembly. Then make and mark stretcher for the front legs.



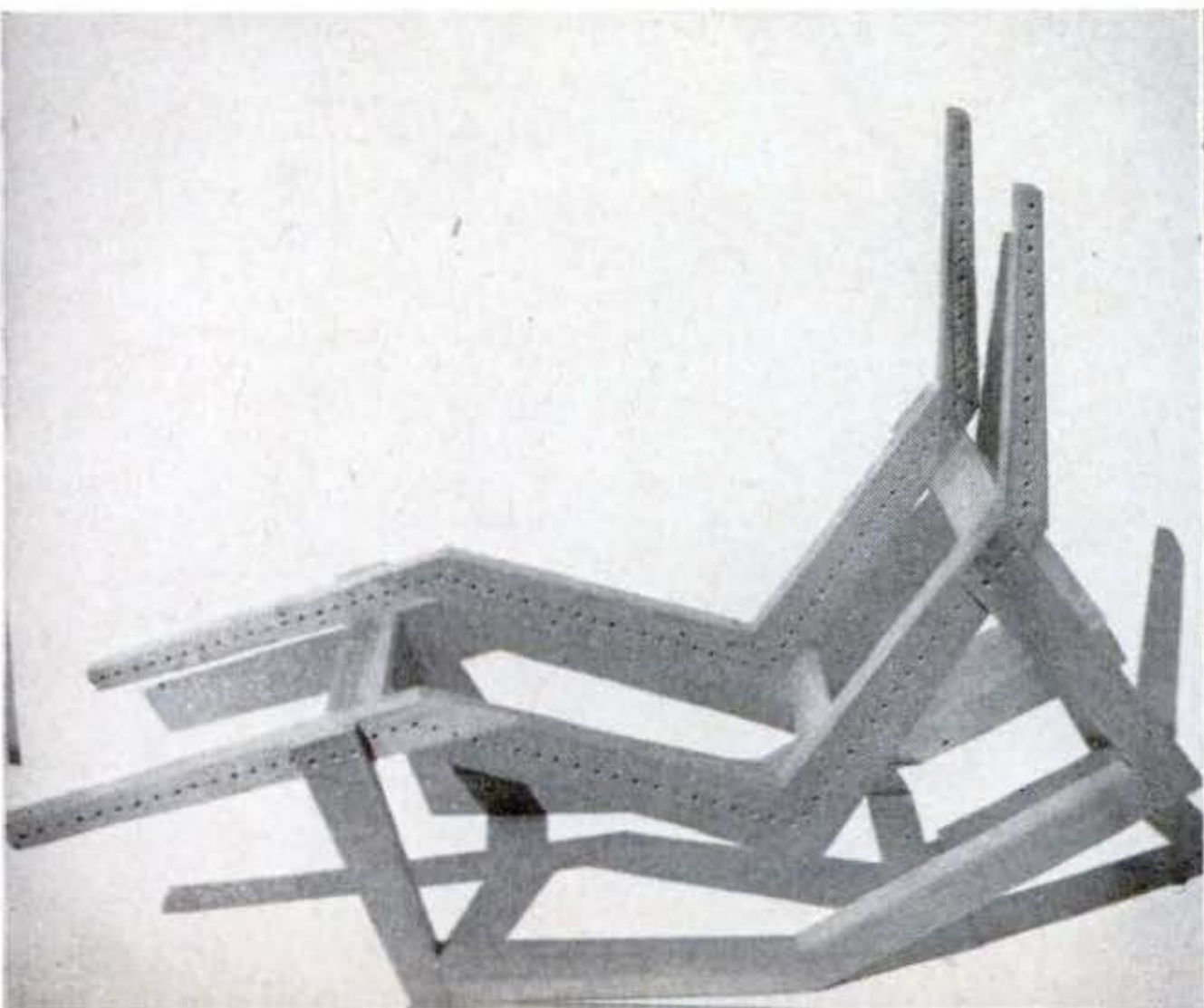
FROM REST OF ONE-BY-TEN make center stretcher to fit notches. Fasten the three stretchers into place with flathead screws. Use 2¼" screws on the leg assembly.

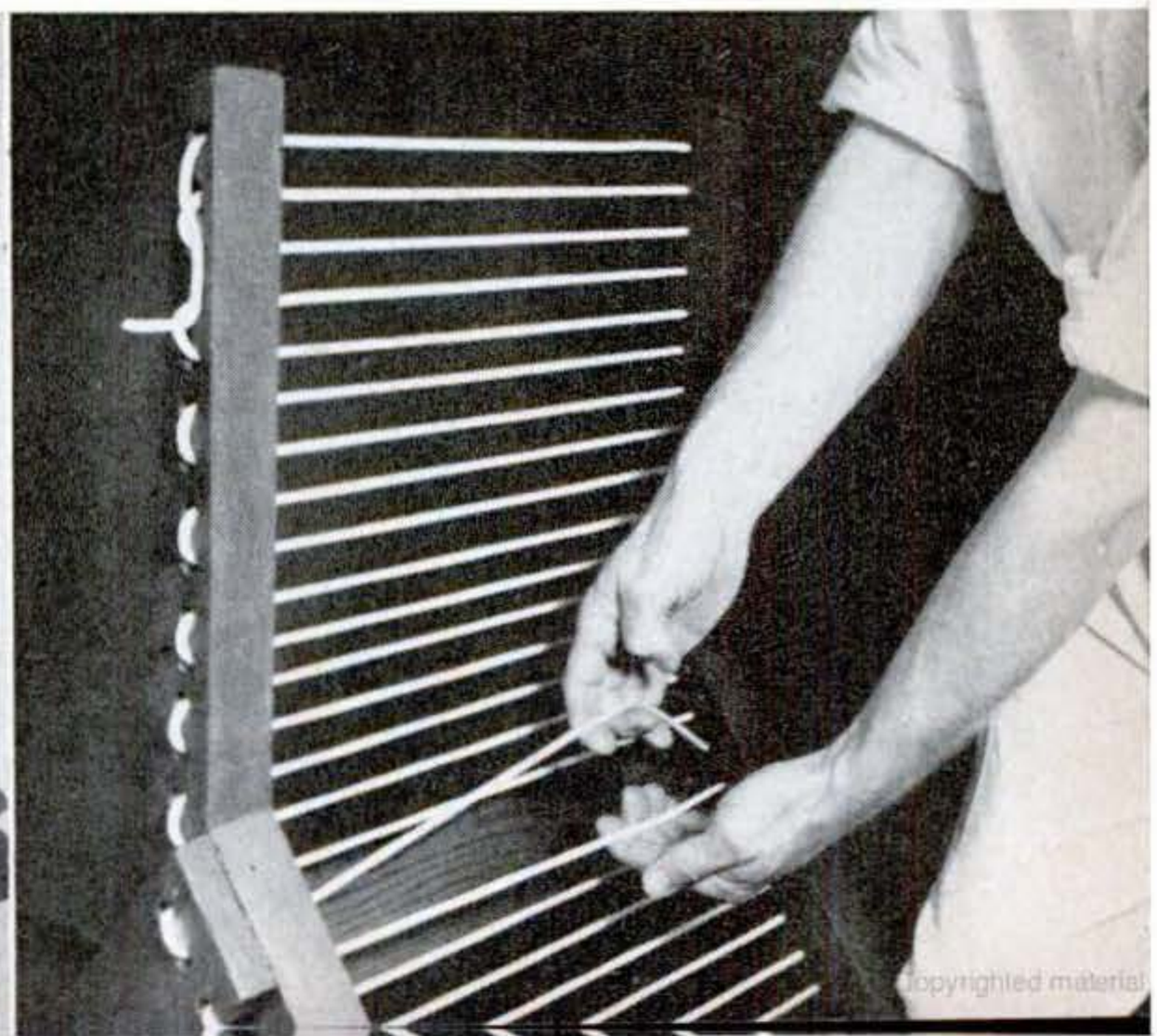
Copyrighted material

Completed chair is an ideal place to take a summer snooze, to read—or even to sun-bathe.

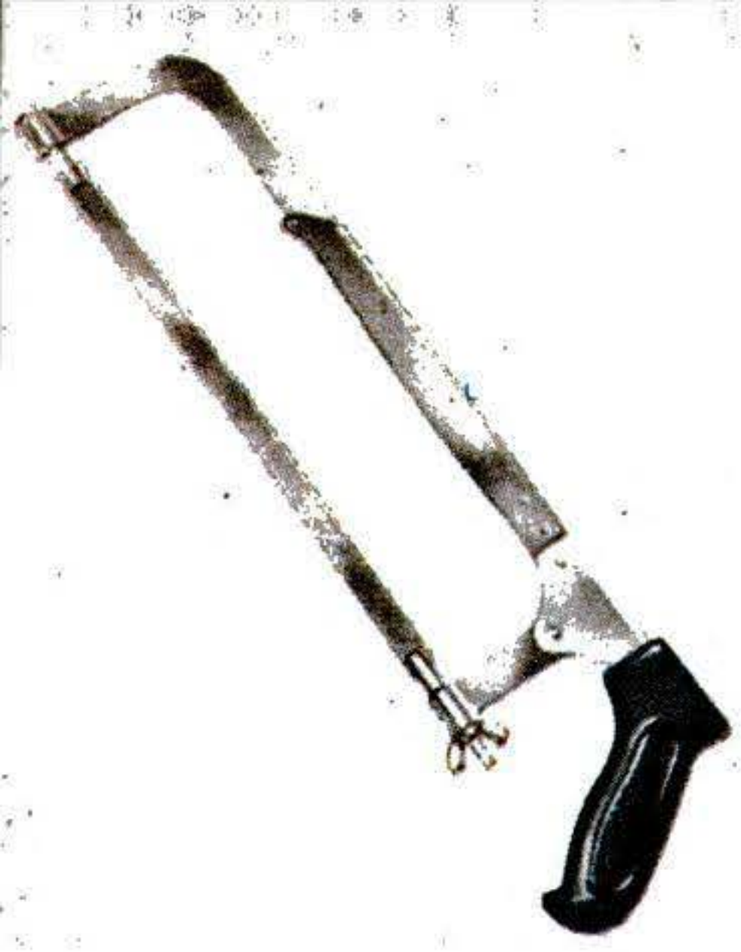
MARK NEARLY COMPLETE FRAME for any trimming necessary. Then take apart and reassemble permanently, using glue on joints. **Use eight flathead screws in front and rear stretchers, two at each joint. Use two 2¼″ screws at each joint between leg and assembly, oval- or roundhead screws elsewhere.**

THREAD IN PLASTIC clothesline and secure it by slipping end under a couple of loops, as shown here. Tighten by working slack from **middle toward ends. Use a hand-to-hand motion, pulling until cord is taut. If it loosens with constant use, it can be retightened quickly and easily this way.** END





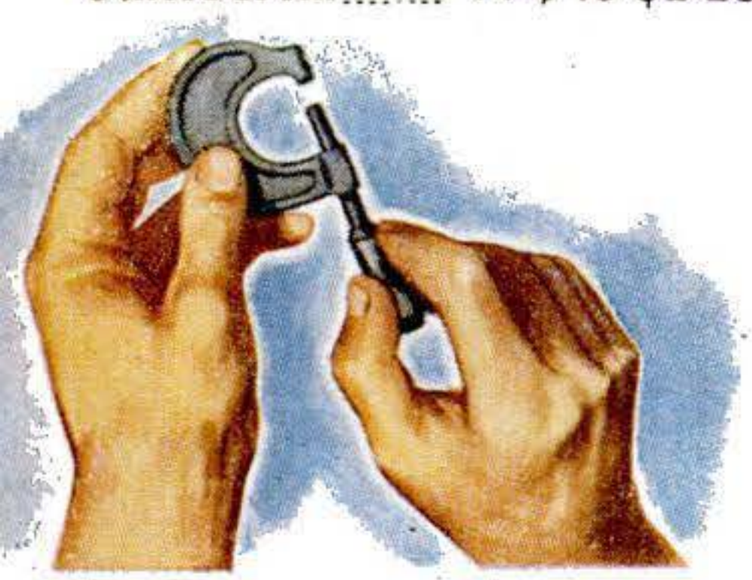
Copyrighted material



Cuts in all 4 directions in metal, plastic, etc. Hacksaw adjusts for blades from 8" to 12"...cuts 2¾" deep. Perfectly balanced frame of heavy, nickel-plated steel. Rust-resistant. Shockproof handle... comfortable, pistol-grip design. With 10" blade. (4HR4156) **$1.25**
Others from ..... **77¢ to $2.25**

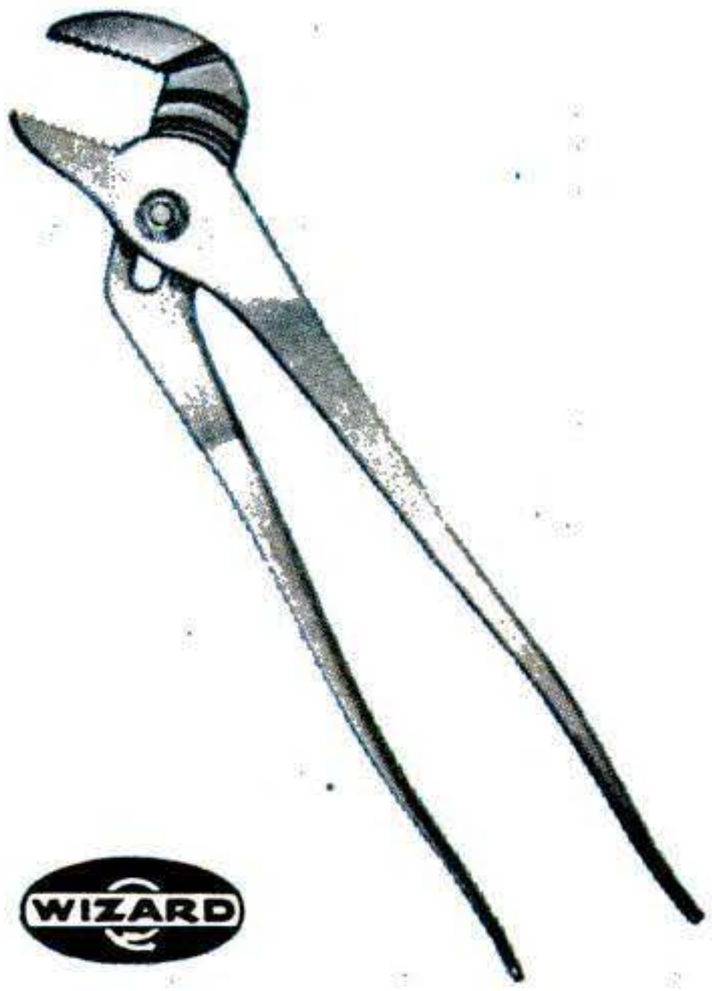
Delivers smooth, quiet flow of power longer. Wizard V-belt is perfectly balanced... holds peak efficiency with fewer adjustments. Powerful cable cords, preheated in liquid rubber and locked in non-heat-generating cushion stock. Double service jacket. 22" to 100." (2HR1922-88)...**61¢ to $2.69**

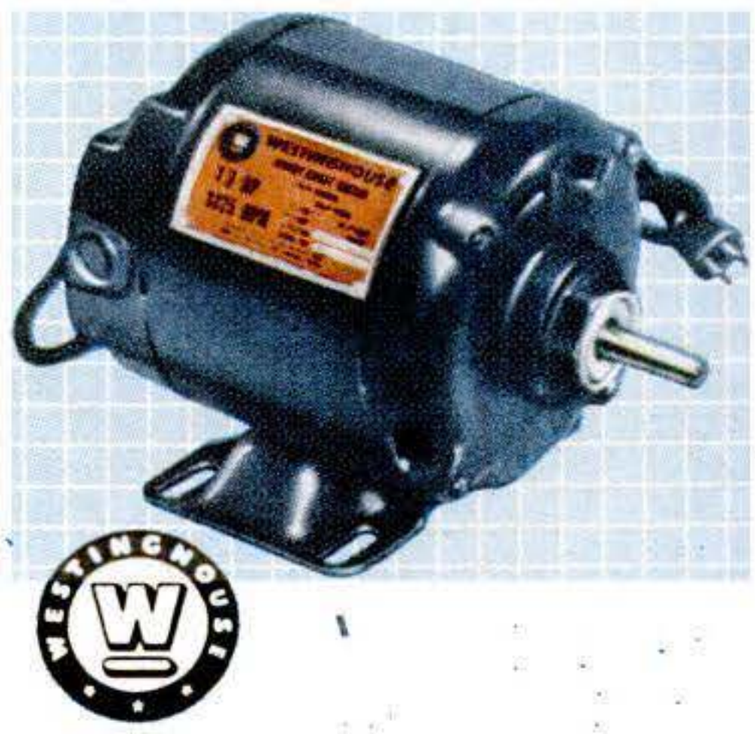
Gives a "piano" finish to rough wood, metal surfaces. Speedway Speedsander ends tiresome hand sanding, polishing. Powerful direct drive ball-bearing motor. "Natural" orbital motion—3450 times a minute! Uses any sheet abrasive. Lightweight aluminum housing. (2HX1140) **$34.50**



The Pick of America's Finest

Save time, save work... do it





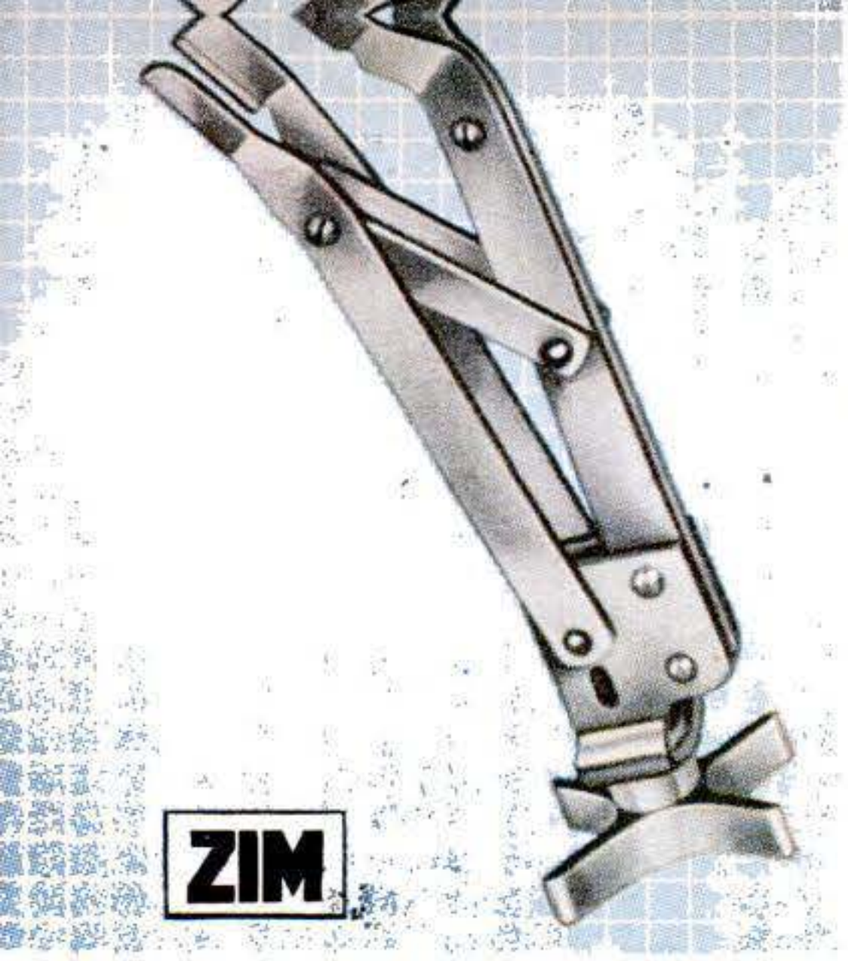
Delivers steady, high speed, vibration-free performance with the precision accuracy demanded by skilled craftsmen. Darra-James tilt arbor saw has big (16"x20") Blanchard ground iron table. Cast iron miter gauge. Self-aligning rip fence. Cuts 2⅝" deep. 8" comb. blade. (2HW1004) **$84.95**

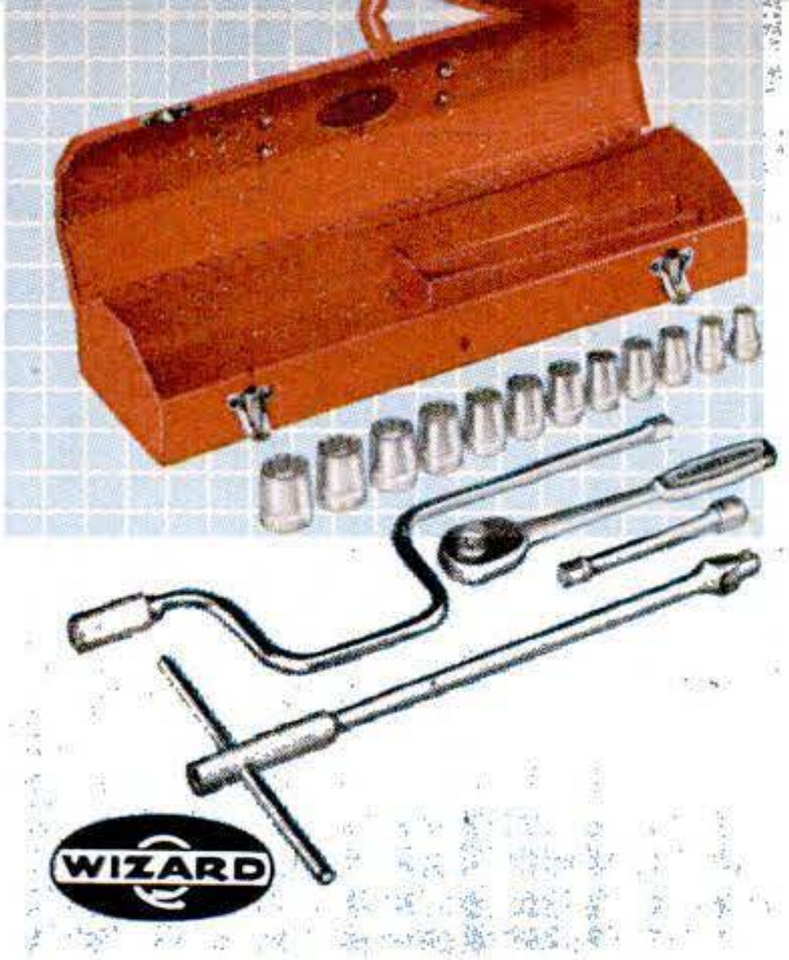
Makes tough turning jobs easy. Wizard "Circle-Grip" plier's deep milled channels give 5 easier, positive adjustments. Jaws always parallel for wrench-like action on nuts, bolts, fittings. Long knurled handles give extra leverage for powerful, non-slip grip. Chrome-plated alloy steel. (HR1204) **$2.65**

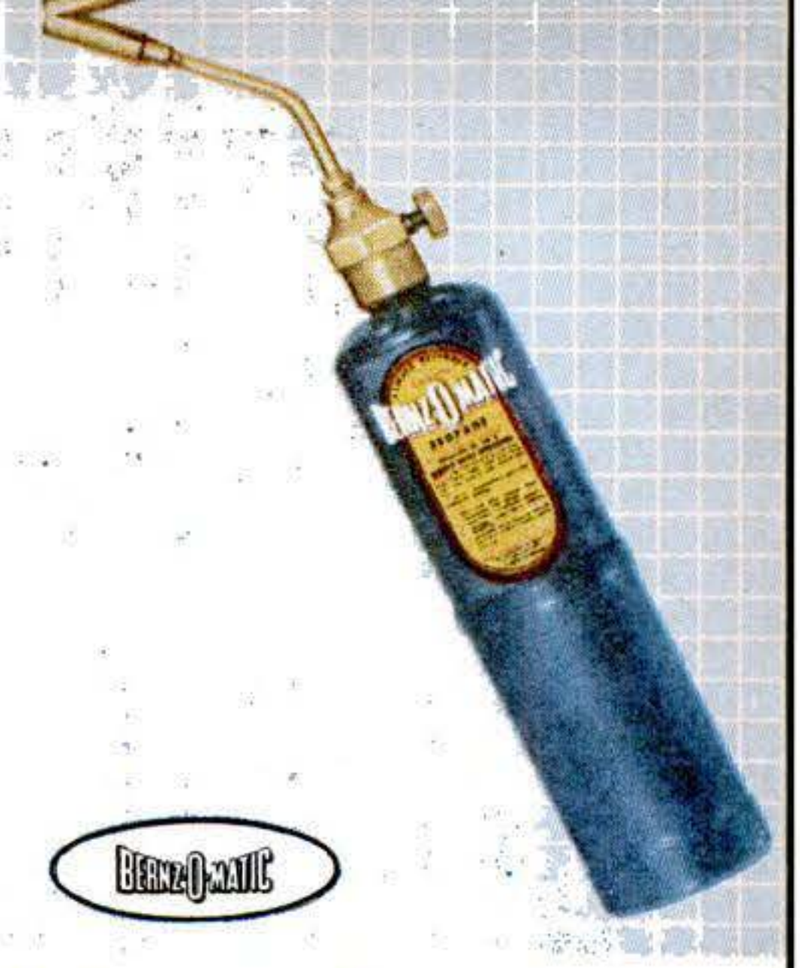
Smooth, long-lasting power for drill press and other vertical applications. Can also use 1/3 H. P. Westinghouse split-phase motor horizontally for saws, lathes, etc. Sleeve bearings, nylon thrust washers. Moisture-resistant windings. 1725 rpm. 115 v., 60 cyc. A.C. 1-yr. warranty.(2H1601)**$19.50**

Choose from over 1,100 professional quality power and

Copyrighted material







Mechanic's choice. Zim combination valve and spring compressor has high-lift, parallel-acting adjustable jaws for greater adaptability. Hand wheel turns for either compressing or lifting a spring . . . holds automatically at any point. Heavily built—practically unbreakable. (4HR3106) . **$3.29**

Chrome-plated alloy steel sockets (hot broached, with uniform tapered walls) easily tighten a wide range of nuts, bolts at any angle. Wizard 17-pc. set includes twelve 12-pt. sockets, 7/16″ to 1″; T-Flex and speeder handles; extension; crossbar; ratchet. ½″ square drive. (HR2951) **$19.95**

No filling, no spilling...no priming, no pumping. Instant lighting Bernz-O-Matic is perfect, easy-to-handle torch for soldering, paint burning, body and fender work, etc. Lightweight—weighs only 2½ lbs. With long-lasting fuel cylinder. (4HR4420) **$6.95**
Refill cylinder (4HR4421) **$1.95**

"Do it Yourself" Tools . . . at Western Auto

STORES AND ASSOCIATE STORES

easier, faster, better . . . and save

NOTE: Western Auto Associate dealers own their stores and set their own prices, terms and conditions. Prices may vary due to differences in local conditions. If you do not know the location of your nearest Western Auto Store, write Western Auto Supply Co., 2107 Grand, Kansas City, Mo. (PS64)

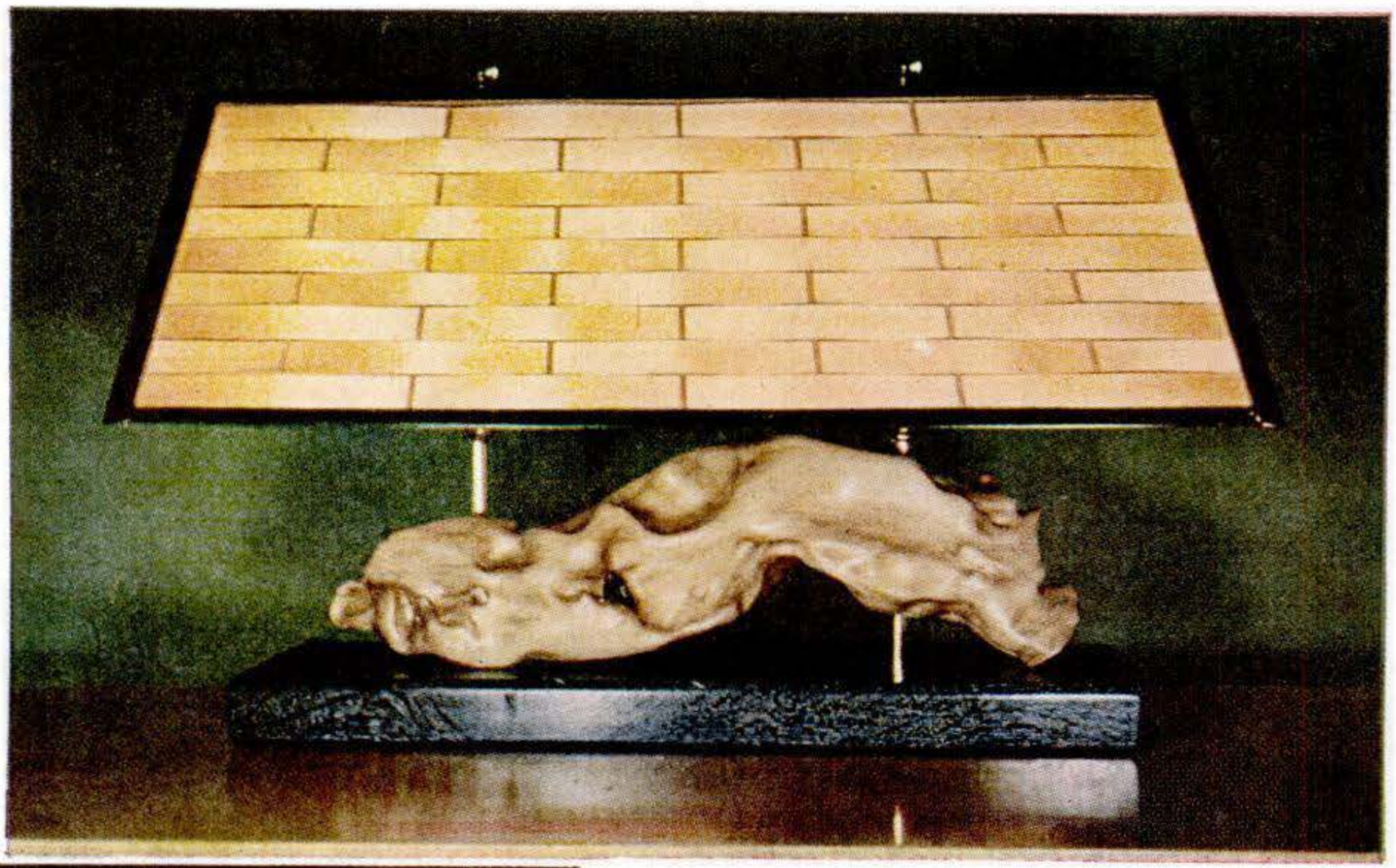
All-purpose screwdriver set. 5 hardened forged steel blades snap snugly into oversize Tenite handle. Includes ¼″ slotted bit for general use, Nos. 1 & 2 Phillips screw bits, plus two sizes clutch head bits. Dozens of uses around the home, garage, shop. In handy wrap-up plastic case. (HR1310) **$1.98**

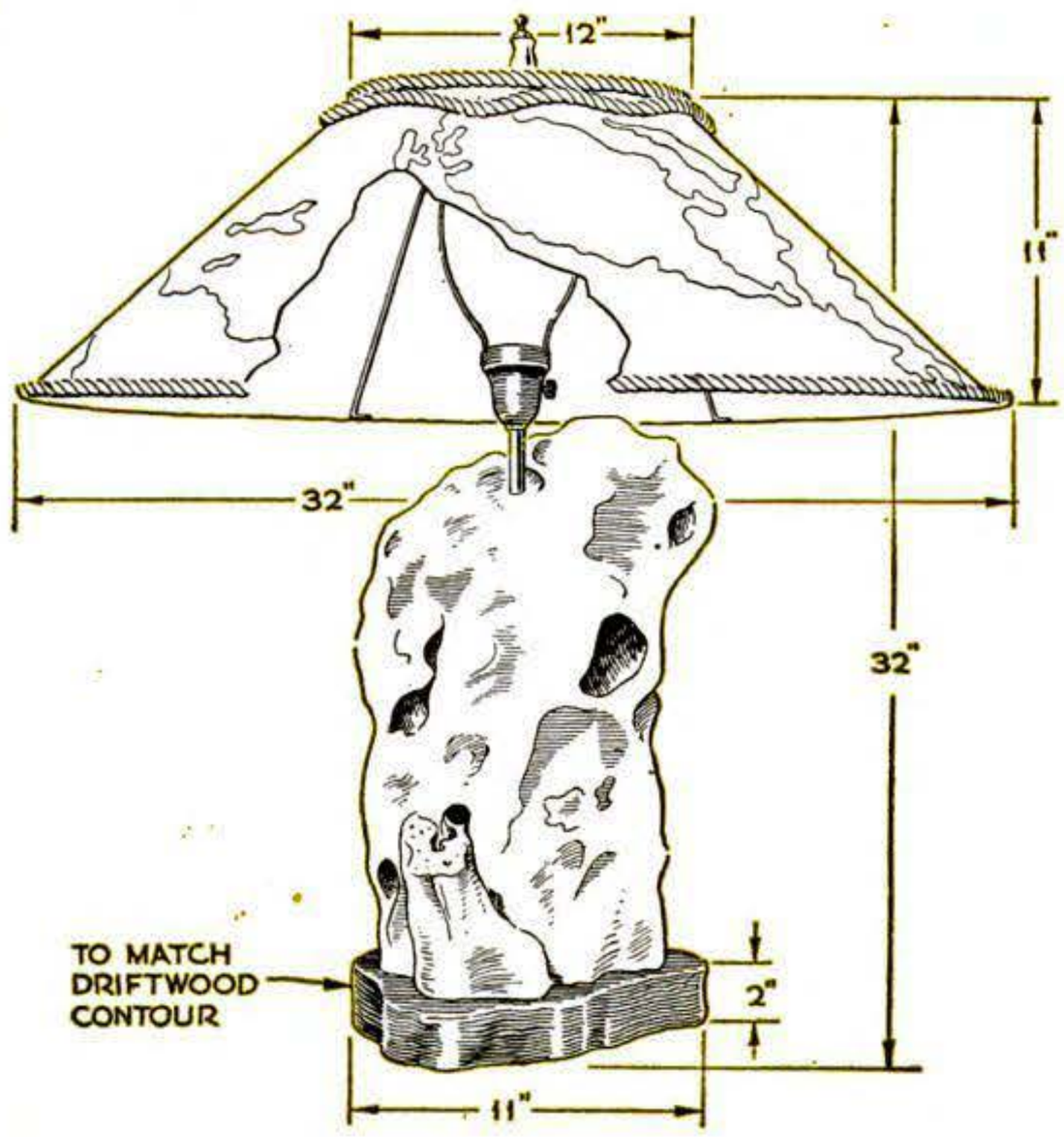
Makes fast work of heavy sawing . . . saves hours of effort. Wizard Zip-saw has 6¼″ combination blade . . . rips or crosscuts to 2⅛″ depth, bevel cuts to 45°. Adjustable rip guide. Precision-cut bronze gears. Lightweight aluminum housing. 110-120 volt, AC-DC motor. (2H1082) **$36.75**

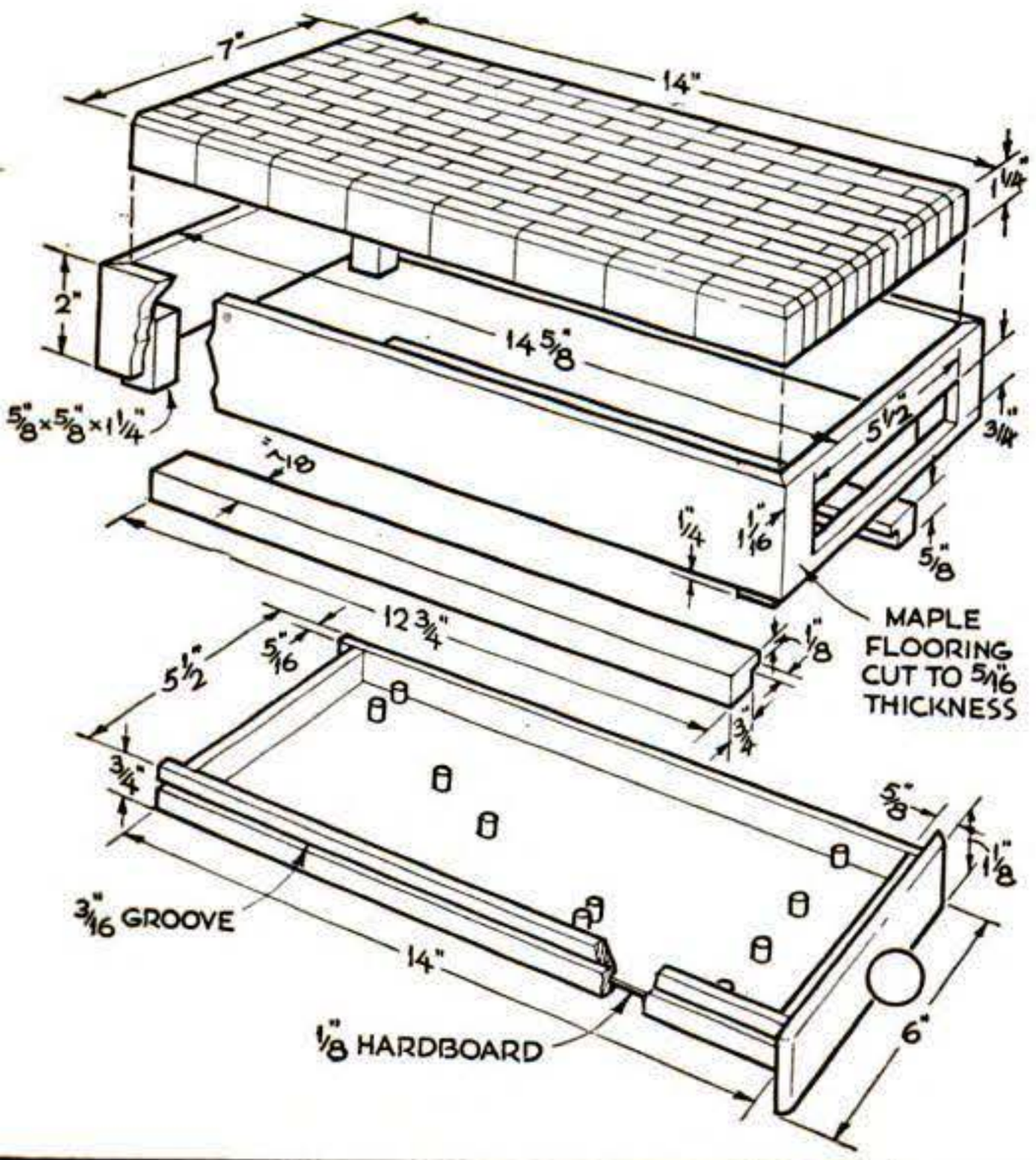
Handful of power! Wizard ¼″ electric drill (famous Fairchild quality) is almost impossible to stall—even in rugged use. Compact, lightweight—less than 4 lbs. Geared key chuck. Lock-type, instant-release trigger switch. Full 2-amp motor for efficient, vibration-free power. (2H1374) **$23.95**

hand tools . . . see your Western Auto man this week.

Copyrighted material







Copyrighted material

Driftwood Lamps Dress Up a Room

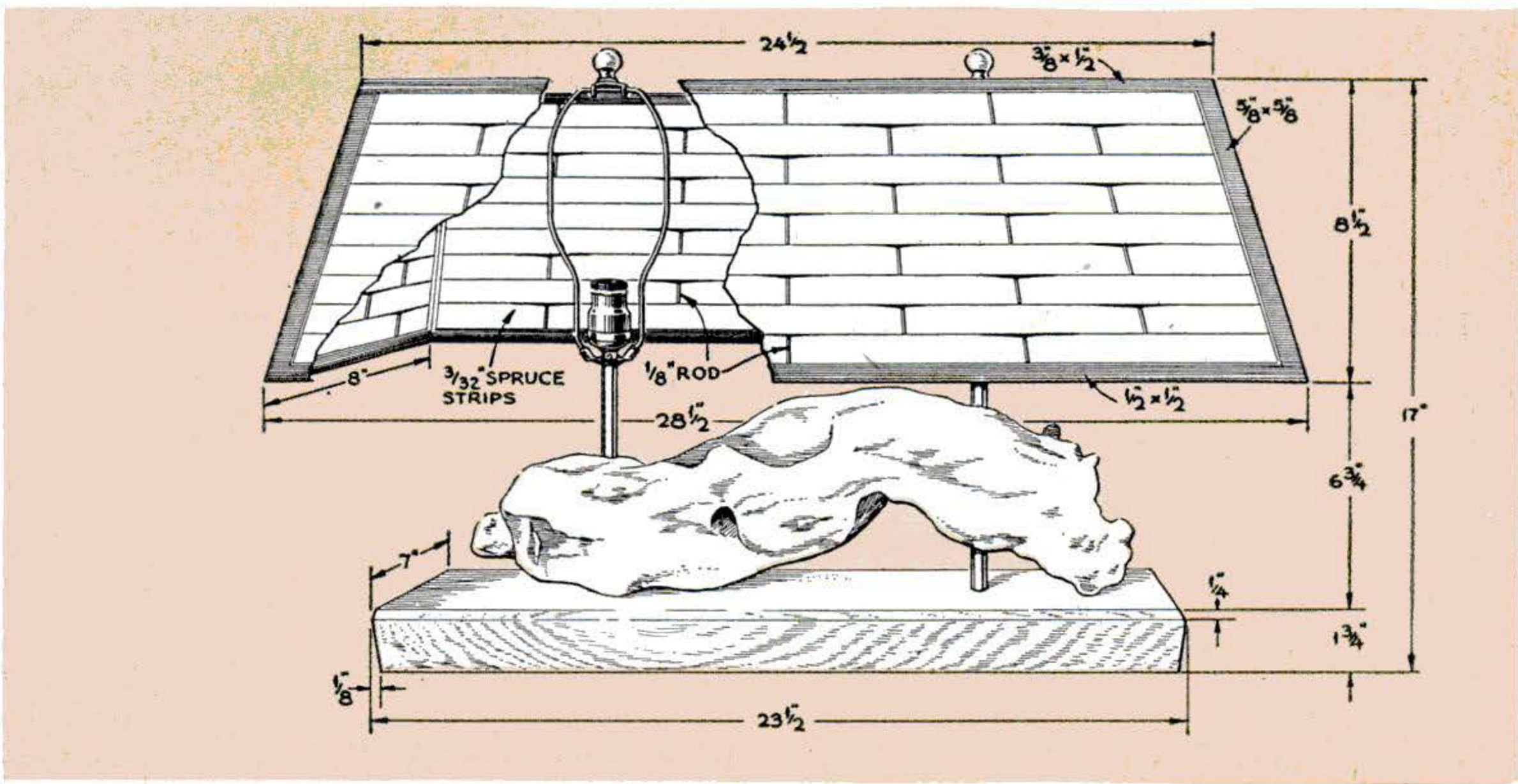
You can round up materials at the seashore this summer and then put them aside to dry for projects like these in fall and winter months.

DRIFTWOOD is where you find it—like gold. And the prices you pay for such objects suggest that gnarled wood is actually second cousin to a precious metal.

Select a piece to suit your purpose and cut it, if necessary, for the best possible configuration. Rapid drying in the sun or near the furnace will produce checks that may improve its appearance. Sand the piece smooth and clean the crevices and knotholes with steel wool or a flexible-shaft tool. Screw the driftwood to an appropriate base and drill holes for the lamp supports.

After a trial fitting, separate the parts and apply wood bleach to the driftwood. When dry, coat it with dull bleaching lacquer.

Shades made from charts or thin wood strips woven over a welding-rod frame blend well with driftwood bases.—*Vern Forsberg, Seattle, Wash.*



Cutting Board Stores Knives, Too

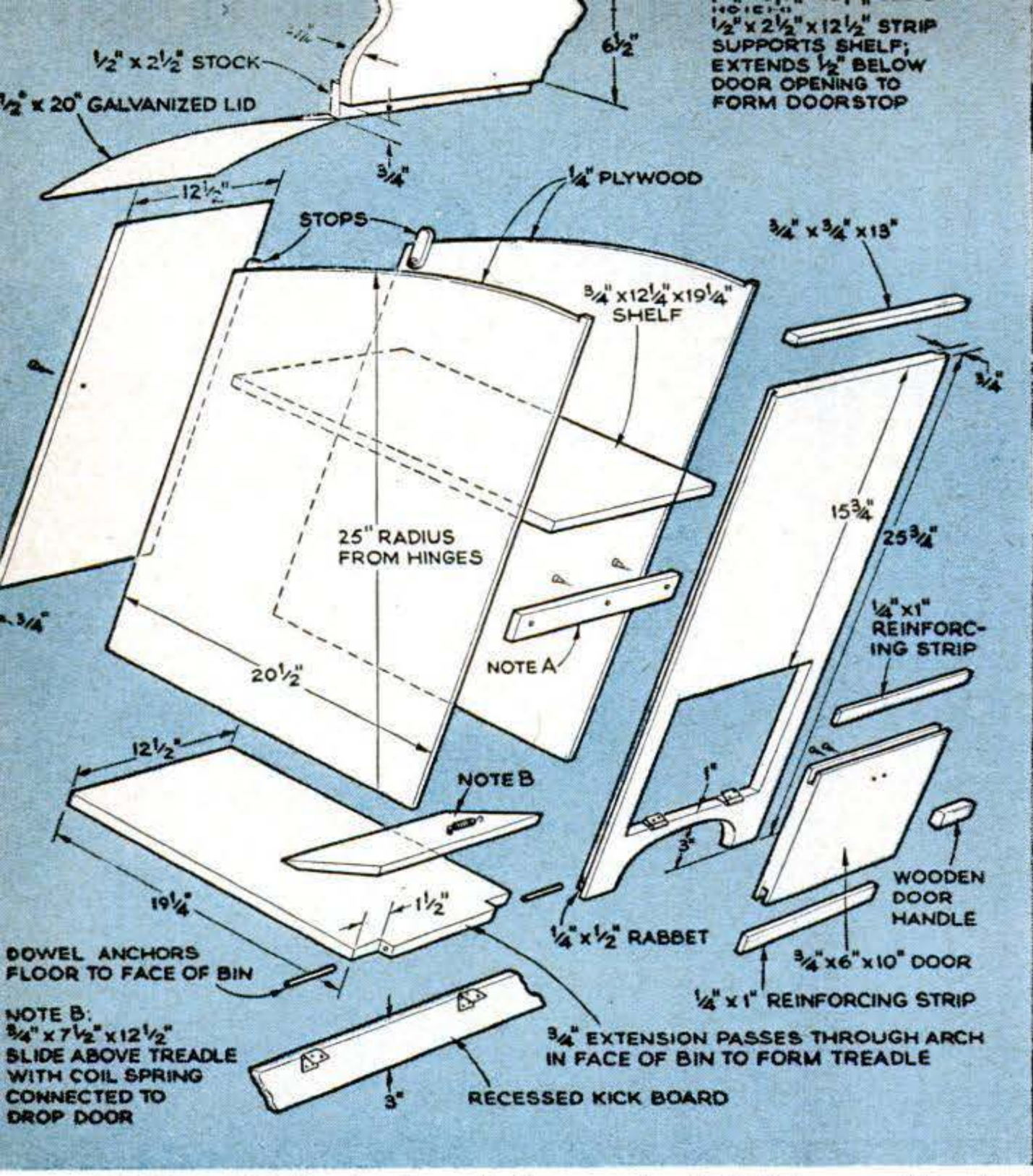
AN ASSORTMENT of knives for cutting and chopping is always at hand for use on the cutting board at the left. They are stored in a drawer fitted in its base.

Glue the four sides of the base together and add legs projecting about ¼″ below it. The legs also reinforce the corners. Cut a shallow rabbet in two strips for the drawer guides, leaving a ⅛″ tongue to ride in a 3/16″ groove which is cut in each side of the drawer.

Assemble the drawer with brads and glue. Arrange short pieces of ½″ dowel in it to suit the knives and tack them in place from below. Finish with lacquer or varnish.

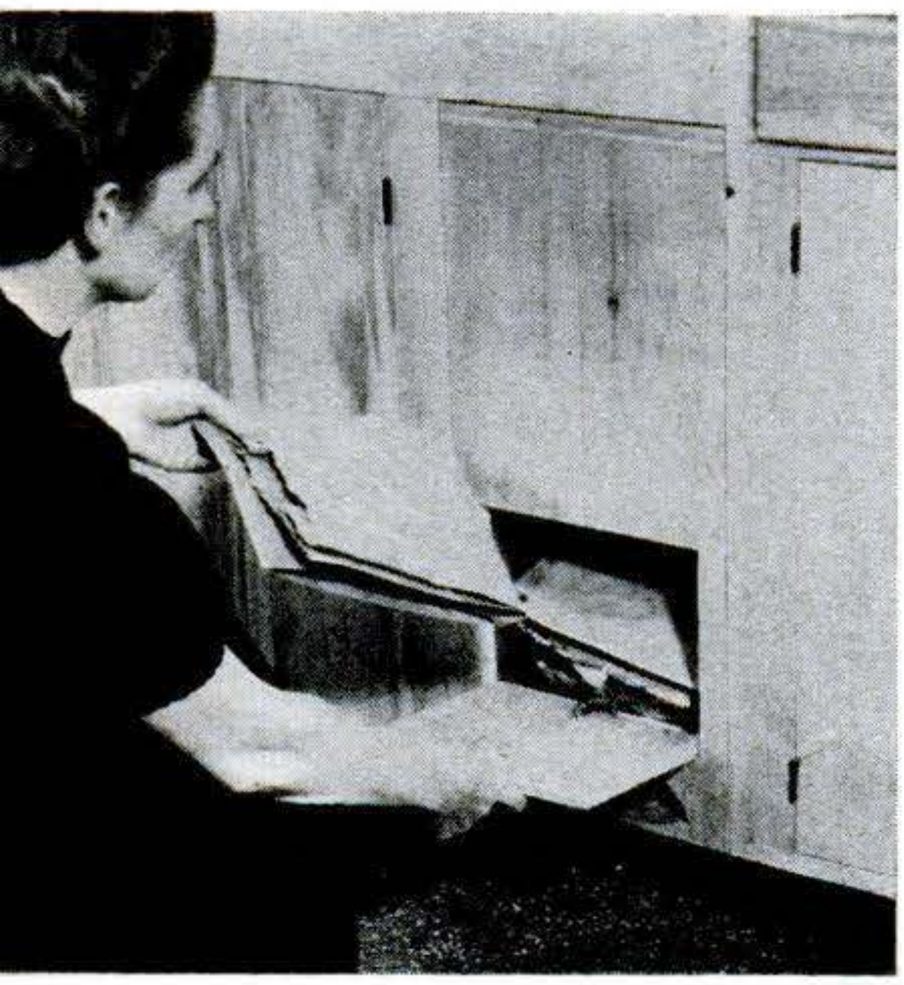
Cut short scraps of maple flooring into little blocks and glue them together with the rows staggered like courses of brick. Plane the top smooth and trim the sides to fit into the open top of the base. Rub the cutting board with a rag dipped in hot paraffin to seal the wood.

Copyrighted material



HINGED BIN is sized to fit in standard 24"-by-36" counter, but width and middle-shelf position can be varied to suit space, size of can. Metal lid must be carefully cut to ride on edges of bin so it can't fall down between them. Cleat on floor supports rear of bin.

Tilt-Out Kitchen Bin Hides Garbage Can



EXTRA BAGS are kept handy in compartment below pail. Small coil spring holds door tightly shut. Separate strip across top edge of bin could be omitted for simplicity, but it helps prevent warping due to extra moisture in the garbage compartment.

Foot-operated disposer frees the hands to scrape waste into a concealed pail.

A TOUCH of the toe tilts out this hinged rubbish bin, leaving both hands free to scrape waste into the concealed garbage pail inside. As the bin closes, the pail is automatically closed by a sheet-metal cover attached to the inside edge of the counter face, sealing in odors and eliminating the need for a separate lid on the pail. A second compartment below the pail stores extra garbage bags.

The bin, which makes use of part of the under-sink waste space, can be made of 1" stock glued up or ¾" plywood, as shown in the sketch, with ¼" plywood for the curved side pieces. To cut the curves, strike an arc from the hinge point to the top of the bin with a pencil and piece of string. Stop strips screwed to the rear corners keep the bin from swinging all the way out, but they can be pivoted aside to permit occasional cleaning behind it.

Hinging the bin at the top of the kick board provides a natural pivot point, easily controlled by light foot pressure.—*John D. Bell, Minneapolis.*

Copyrighted material

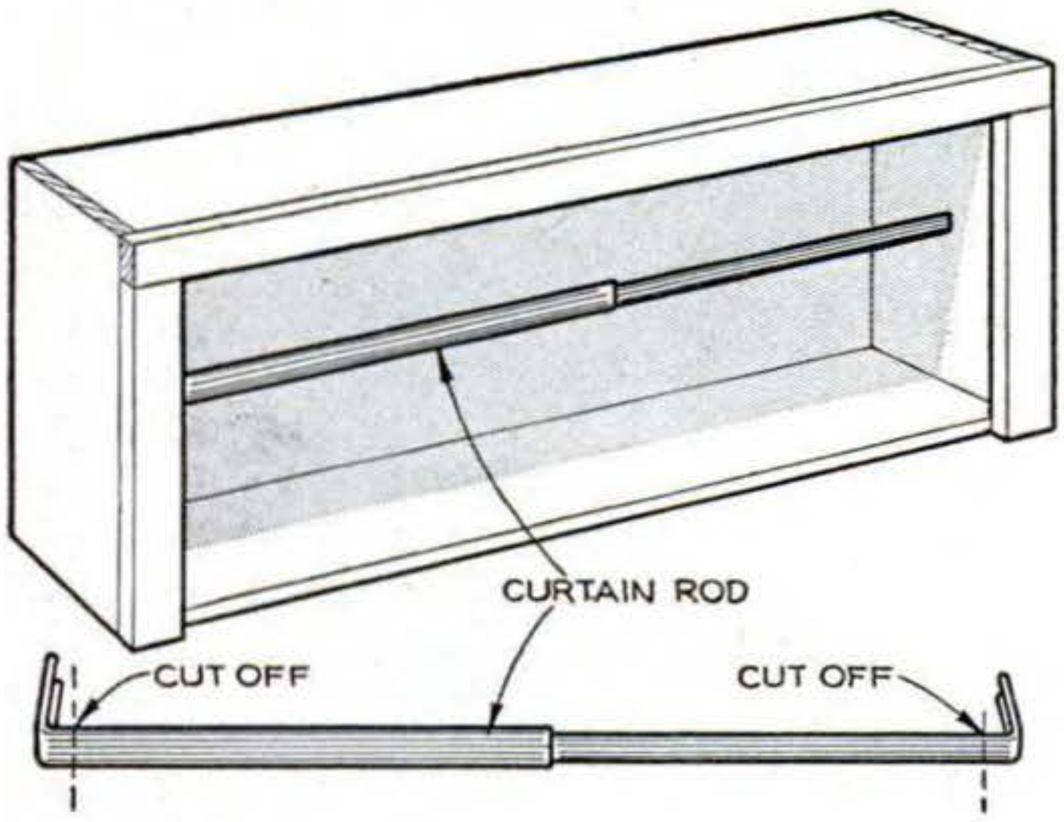
Could You Build This Trick Lamp?

Three bulbs joined end to end, will make your friends stop, look and wonder how it's done.

If you like unusual projects, here's one for you. On first seeing this odd lamp, anyone with normal curiosity is sure to do a double take. The lamp doesn't seem believable. But it is. It works just as well as any other lamp. The fun you'll have with it will more than repay you for the few hours needed to put it together.

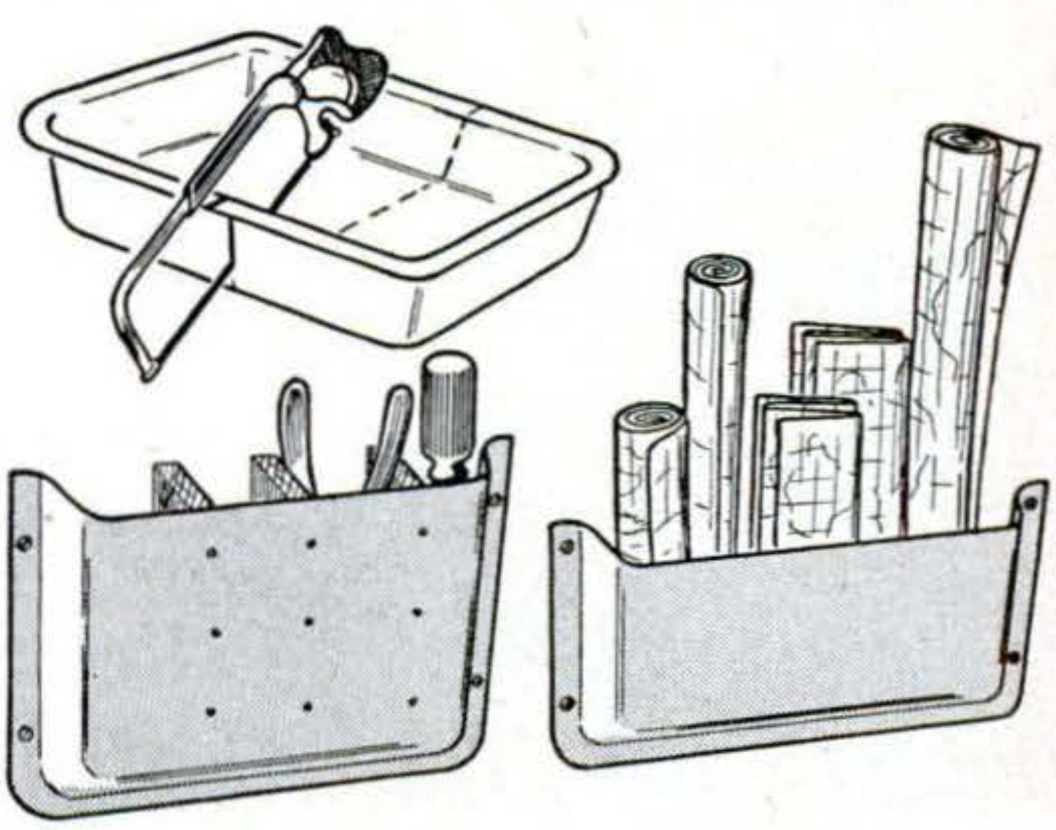
Before you read how to build it, can you figure how it works?

Please turn the page to see how.



Curtain Rod Makes Inside Rule

Measuring inside dimensions is easy with a telescoping curtain rod. Cut off the curved ends, stretch out the rod to fit, then transfer it to the work or to a regular rule to get the proper measurement.—*V. H. Lamoy, Upper Jay, N.Y.*

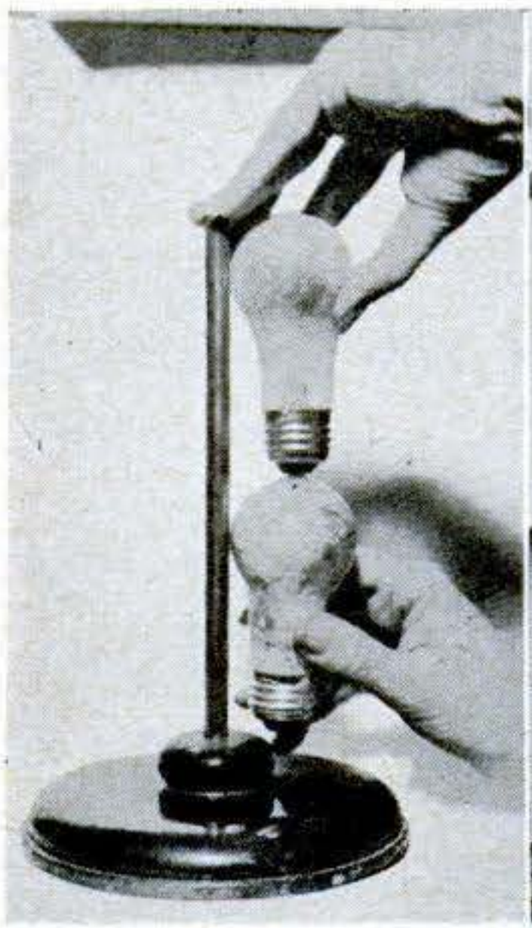


Cake Pan Holds Shop Tools

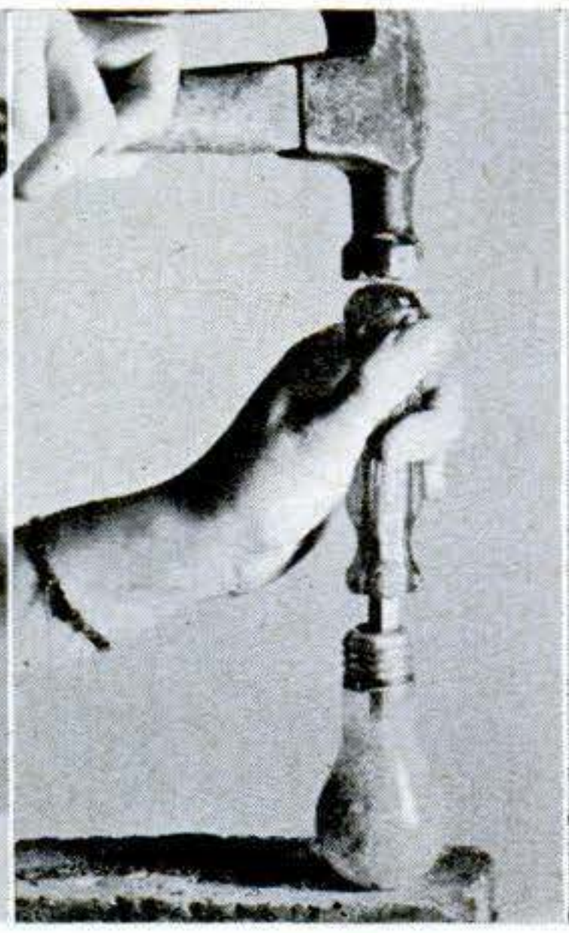
An aluminum cake pan, cut off at one end and screwed to a shop wall through the flange, makes a fine storage pocket for sandpaper and other flat sheets. Wood dividers can be added to make pockets for tools.—*Norm Jacky, Fond du Lac, Wis.*

Copyrighted material

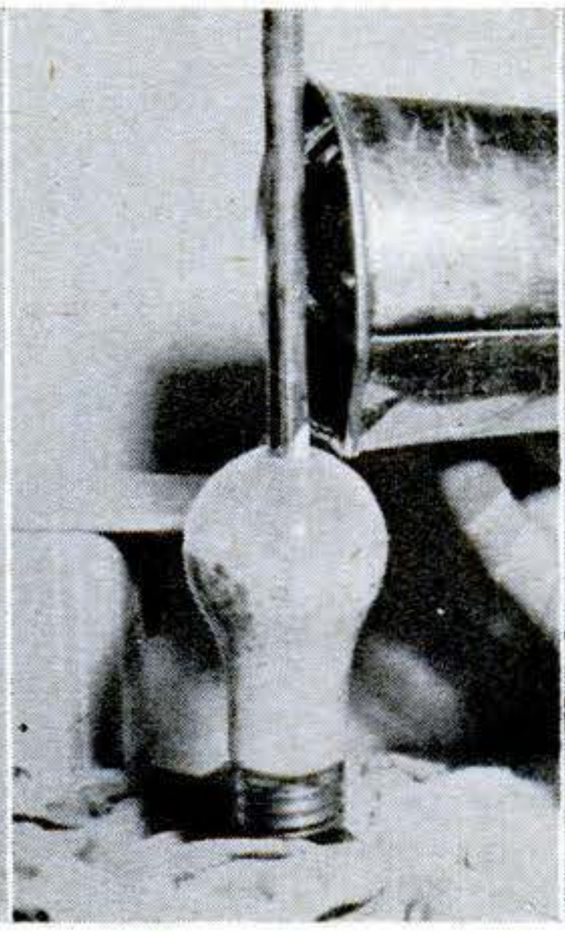
Photoflash Bulbs Are the Secret of This Unusual Lamp



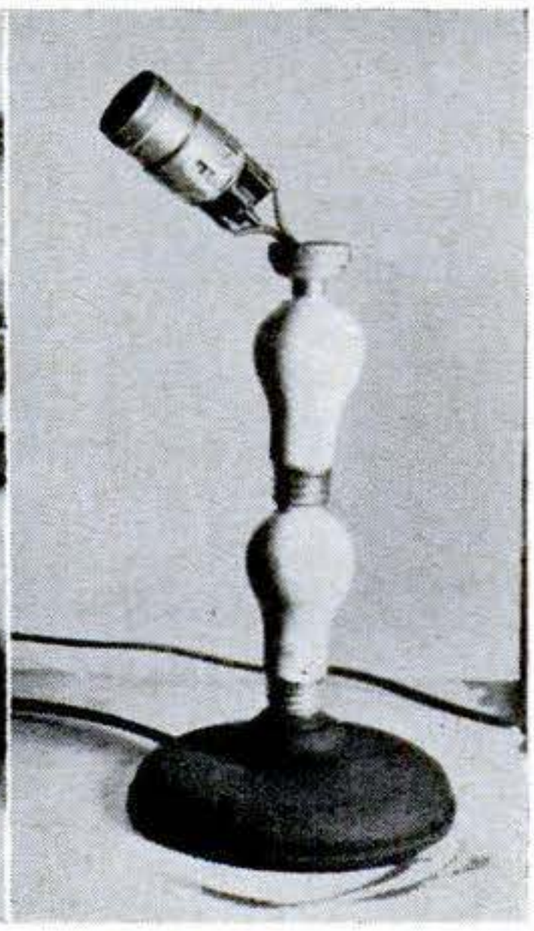
HOLLOW PIPE to carry the wire should be slightly longer than two flash bulbs.



HOLE IS PUNCHED in end of bulb with a screwdriver after base is cut out.



BOTTOM BULB is filled with watery plaster of Paris after being slipped on pipe.

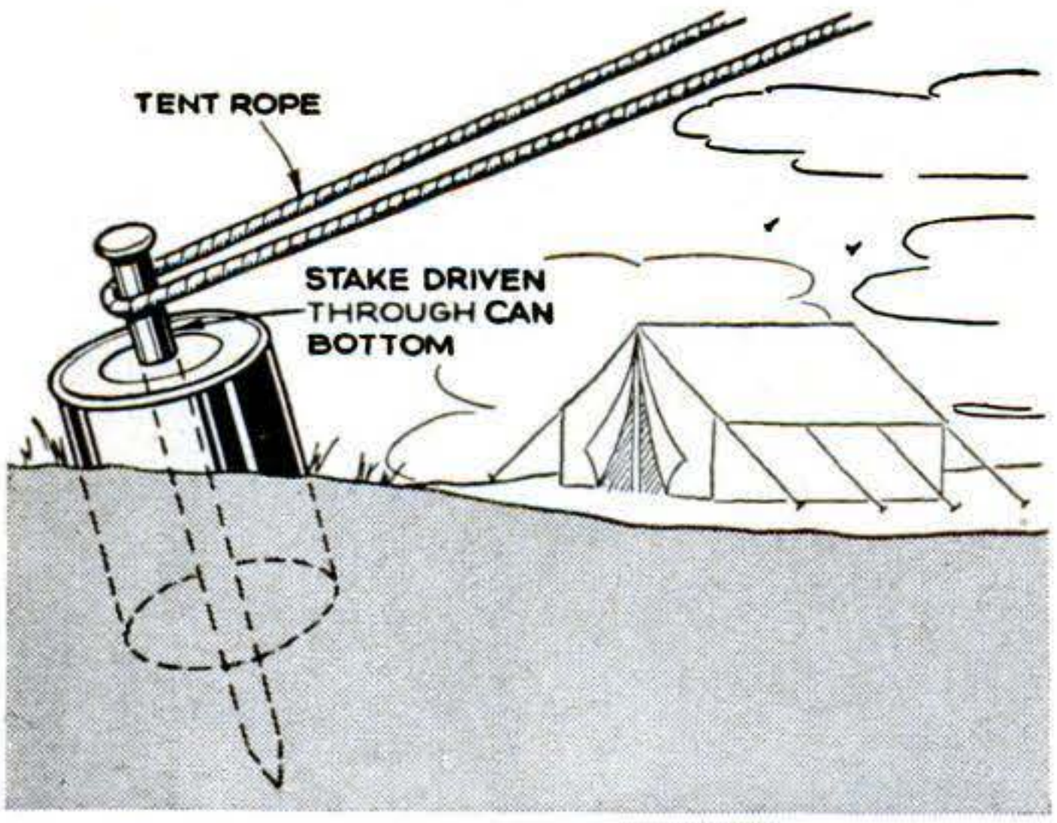


SOCKET is screwed on top of pipe and wires are run down inside it to complete lamp.

An ordinary light bulb would break into a thousand pieces if you tried to punch a hole in it. But using a photoflash bulb, which has a protective coating, you can punch the hole—and still keep the bulb intact.

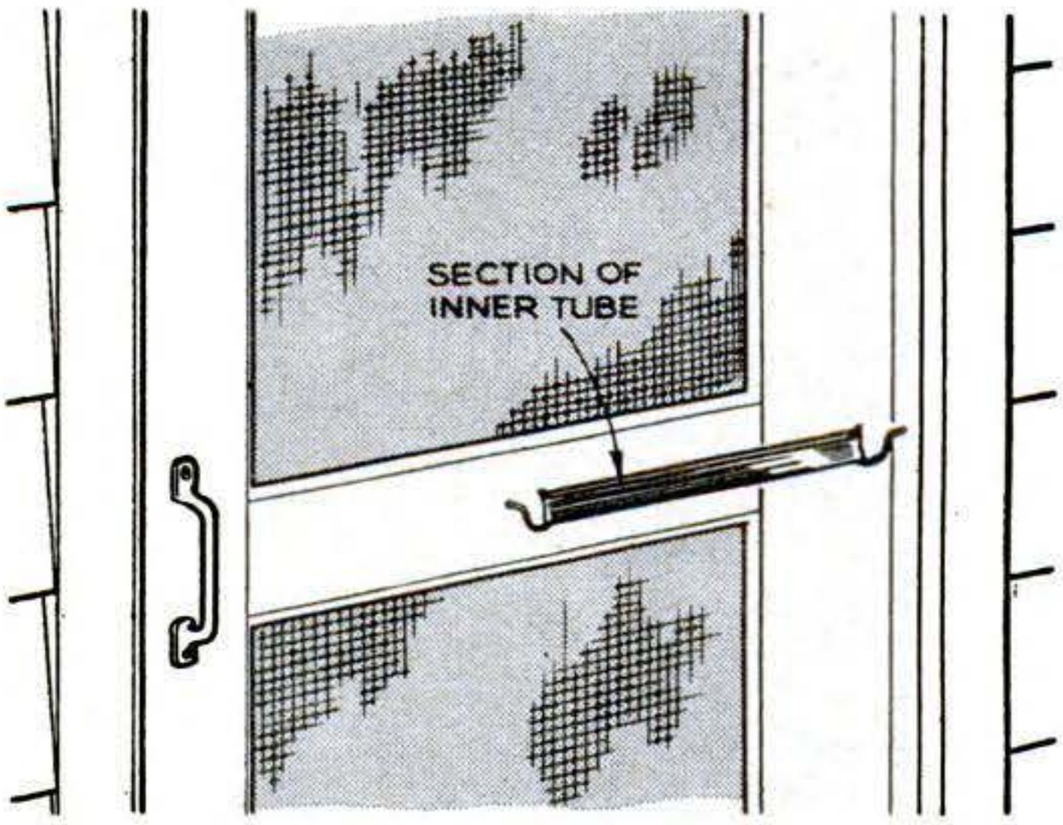
That's how the two bottom bulbs were added to this lamp. A sharp knife was used to dig the insulation out of the base and chip out the wires. Then a screwdriver was used to chisel a hole through the top, the hole being made just a bit larger than the hollow standard over which the bulbs were to go.

After the bottom bulb had been cemented to the base, a watery mixture of plaster of Paris was poured into the bulb. A second bulb was added in the same way. Both were then coated with white enamel.—*Clarence Leino, West Allis, Wis.*



Cans Strengthen Tent Stakes

If you have to pitch a tent on sandy or other loose soil, you can make the guy stakes grip tightly this way. Drive a tin can into the soil first, bottom up, then drive the stake down through the can and it will stay put.—*H. E. Moody, Upper Jay, N.Y.*



Inner Tube Makes Door Spring

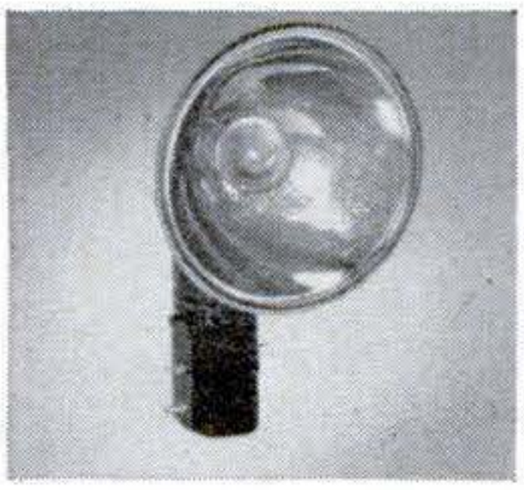
A narrow section cut from an inner tube can be used to keep a door closed on a shed, shop or garage. Screw a hook into the jamb, then stretch out the rubber to see where the other hook should go on the door.—*V. H. Lamoy, Upper Jay, N.Y.*

Copyrighted material

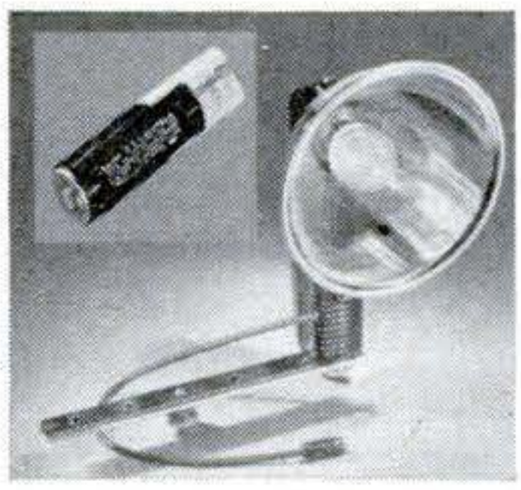
TAKE Vacation Pictures

ANYTIME... ANYWHERE... WITH SIMPLE PHOTO AIDS

No need to miss out on any snapshots you want this summer. The inexpensive Kodak aids shown below can help you make good pictures day or night . . . indoors or out. They're easy to use . . . compact and handy. See them at your Kodak dealer's.



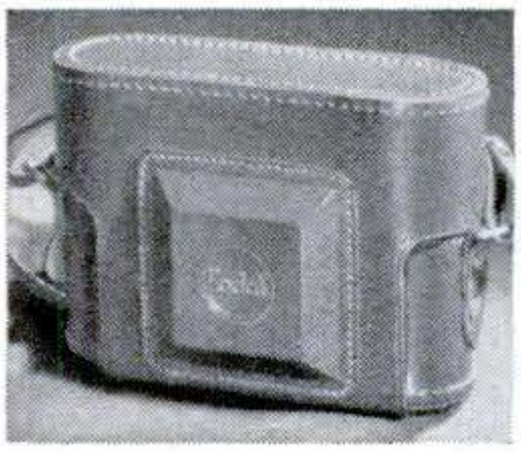
Flash is easy—Kodalite Flasholder (with Lumaclad reflector) for Brownie Hawkeye, Flash Model, and Kodak Duaflex III Cameras. $4.



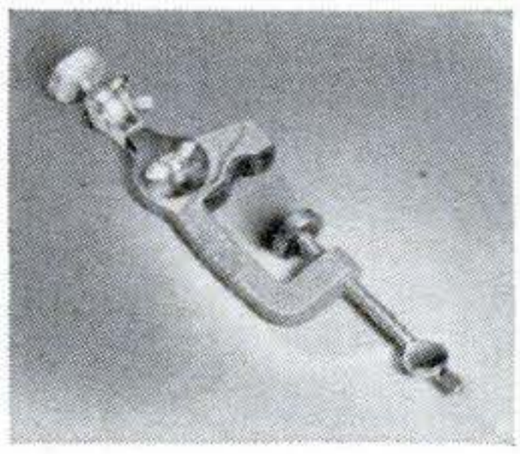
Dependable flash everytime with Kodak B-C Flasholder, $9.95. Or use Kodak B-C Flashpack (inset, $2.95) in Kodak Standard Flasholder, $7.95.

For "close-ups" with most fixed-focus cameras, the Kodak Close-up Attachment, $1.63. Kodak Cloud Filter ($1.85) brings out clouds.

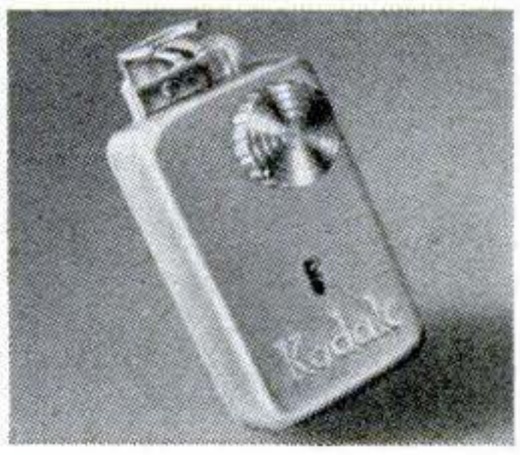
For dramatic shots—Kodak Wratten Filters (from $1.75) fit most every camera; easiest way to improve both your black-and-white and color shots.



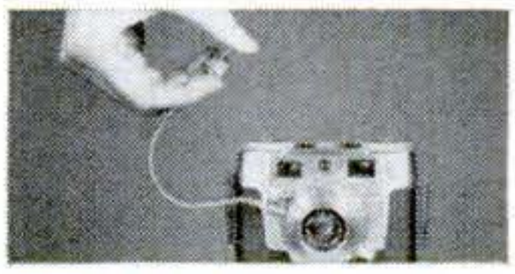
A "must"—Handsome Kodak carrying cases protect cameras, make them easy to carry. From $2.65.



To support camera and flash unit, attach to most any surface with sturdy Kodak Flexiclamp. Only $4.95.



Get into your picture—Kodak Auto-Release trips shutter automatically at intervals up to 10 seconds. $3.86.



Aid steady shooting—Kodak Metal Cable Releases fit most cameras having cable release sockets. Will not kink. From $1.05.

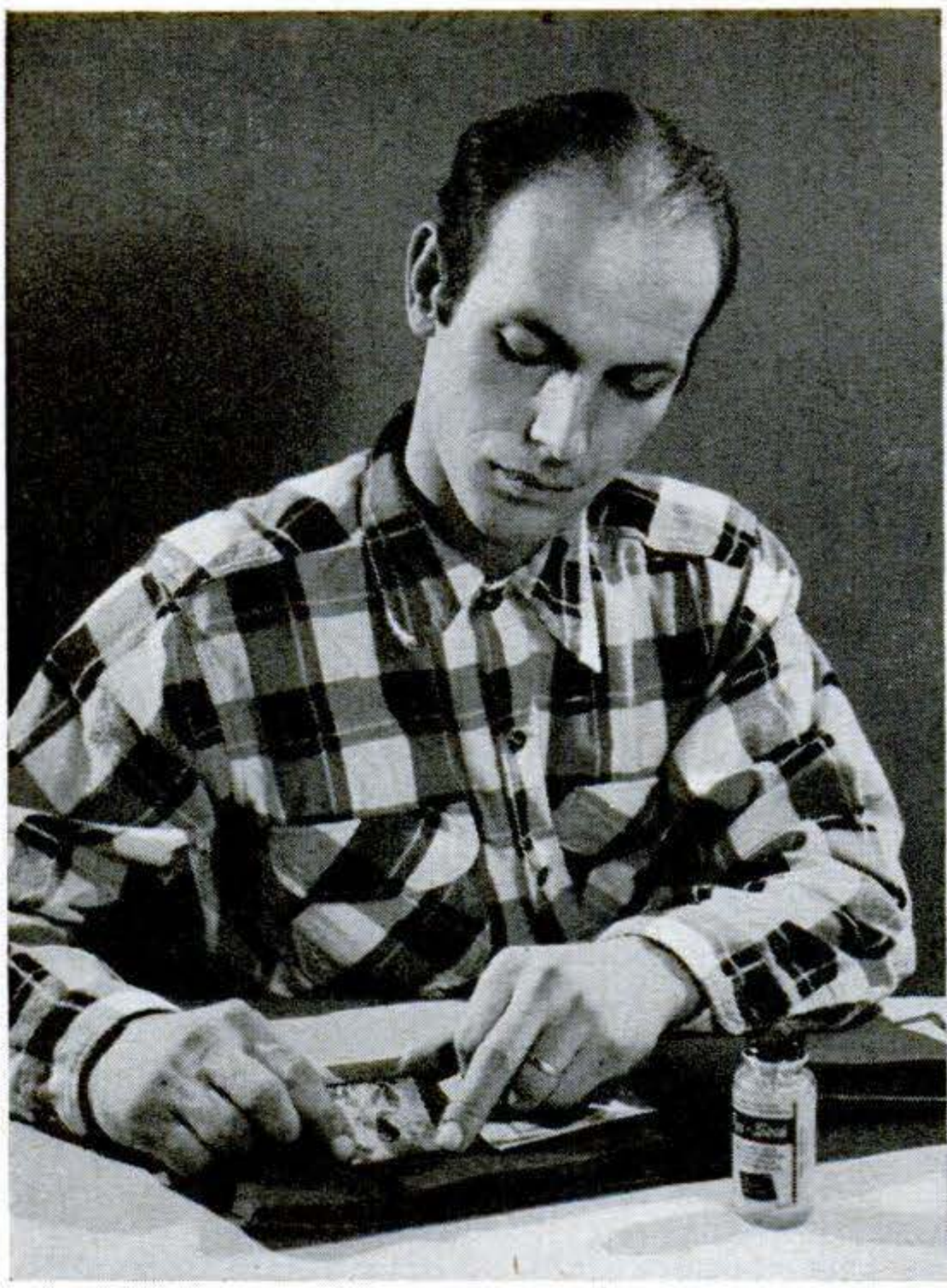
Prices subject to change without notice

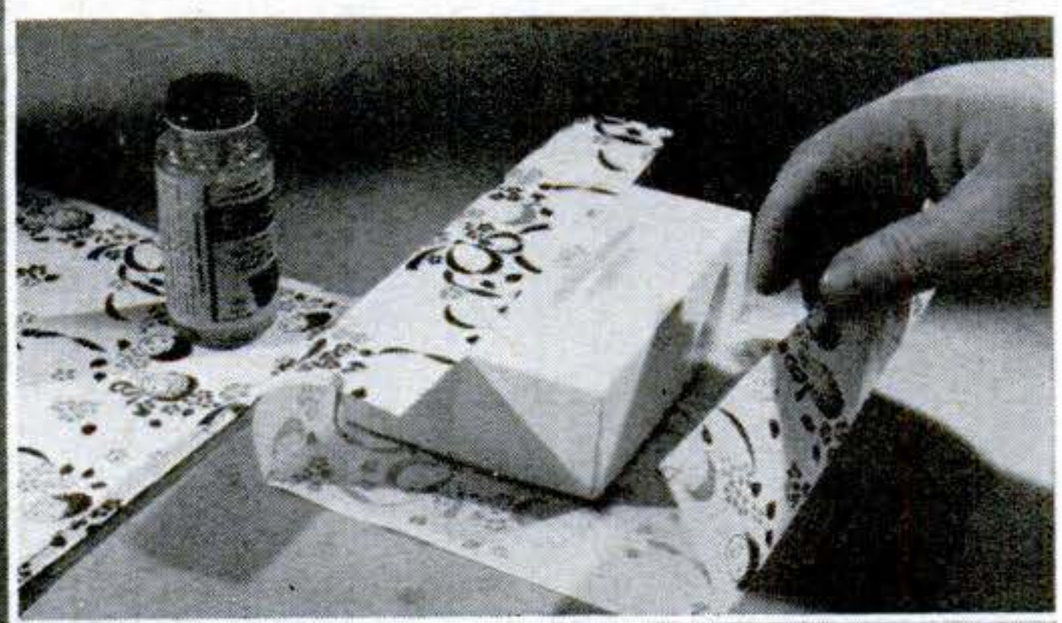
Eastman Kodak Company, Rochester 4, N. Y.

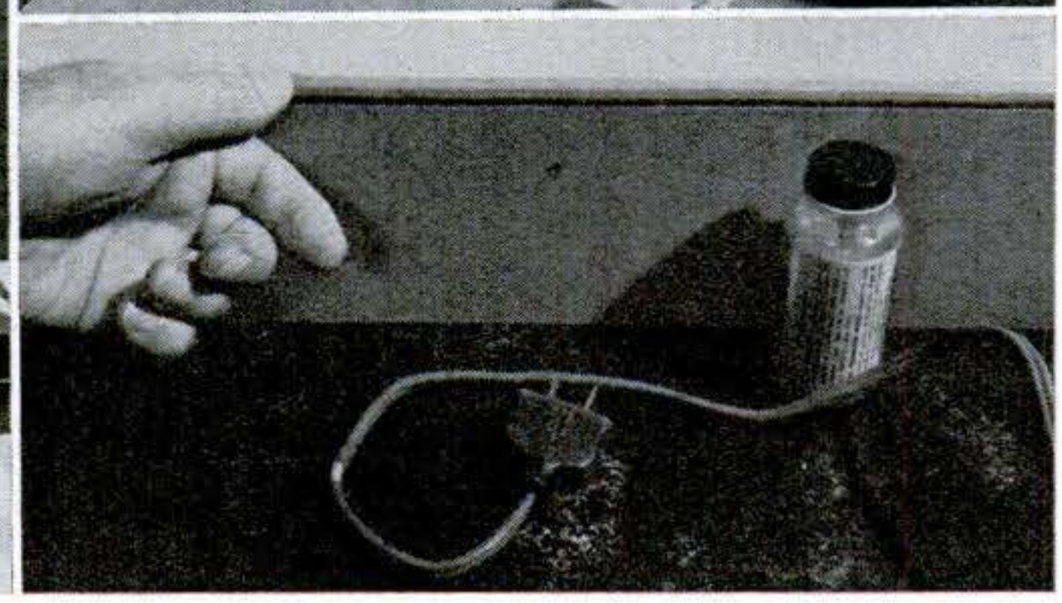
Kodak
TRADE-MARK

Copyrighted material

Adhesive You Can Use and Use Again







A NEW latex adhesive produces a self-sticking surface on paper, cardboard or other material. The coated object can even be pulled off and restuck again and again. Here are some uses.

Photos or stamps mounted in an album with it can be peeled free and arranged in a new grouping without additional adhesive or damage to photos or album.

You can wrap a gift like an expert without either tape or string. Just apply the adhesive to the paper edges and they stick right where you put them. Removal leaves no mark.

If you are running an electric cord around the baseboard, you can forget about staples. Coat the cord, then stick it neatly to the top of the board.

The bottled adhesive is a product of Bienco Distributing Co., Costa, Mesa, Calif.

Steel Wool Holds Solder Joint

WHILE doing some sheet-metal work, I encountered a joint that was too far apart to solder. After applying flux to a clean piece of fine steel wool, I wadded it into the seam, trimmed off the excess, fluxed the adjoining metal and flowed solder into and around the wool with my iron.—*J. H. Seval, Prattsburg, N.Y.*

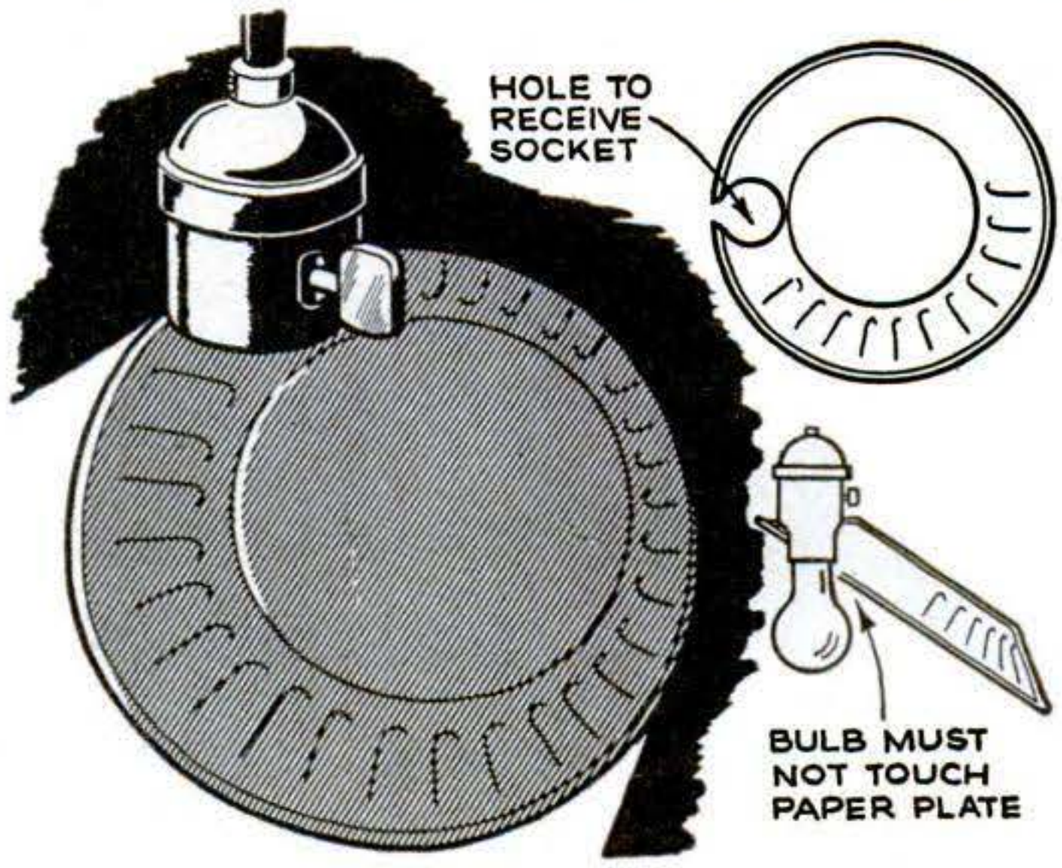
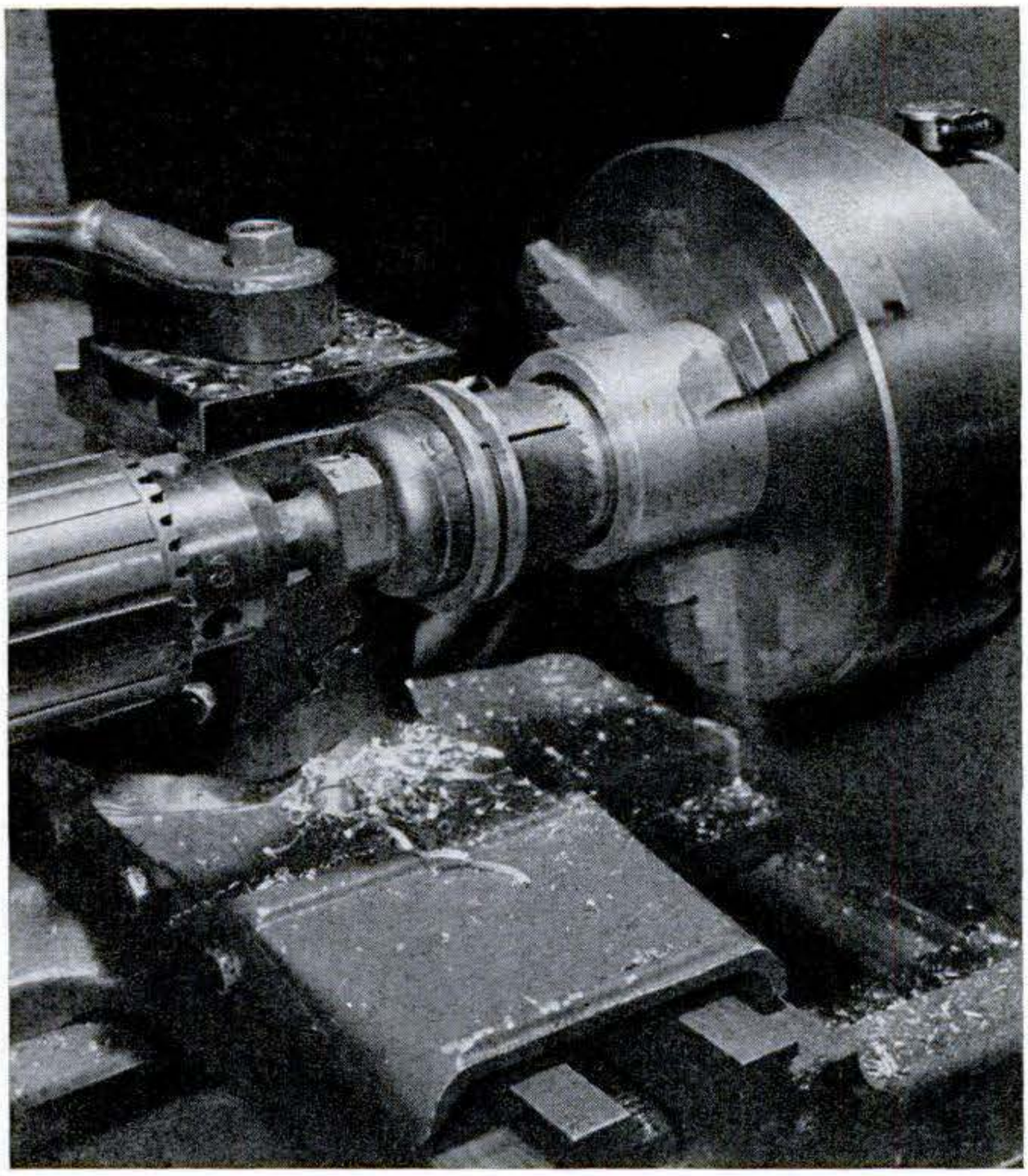


Plate Is Emergency Reflector

A PAPER picnic plate can be used like this as an emergency reflector for an unshielded light bulb. Cut a hole in the plate so it is a snug fit on the socket.

Copyrighted material

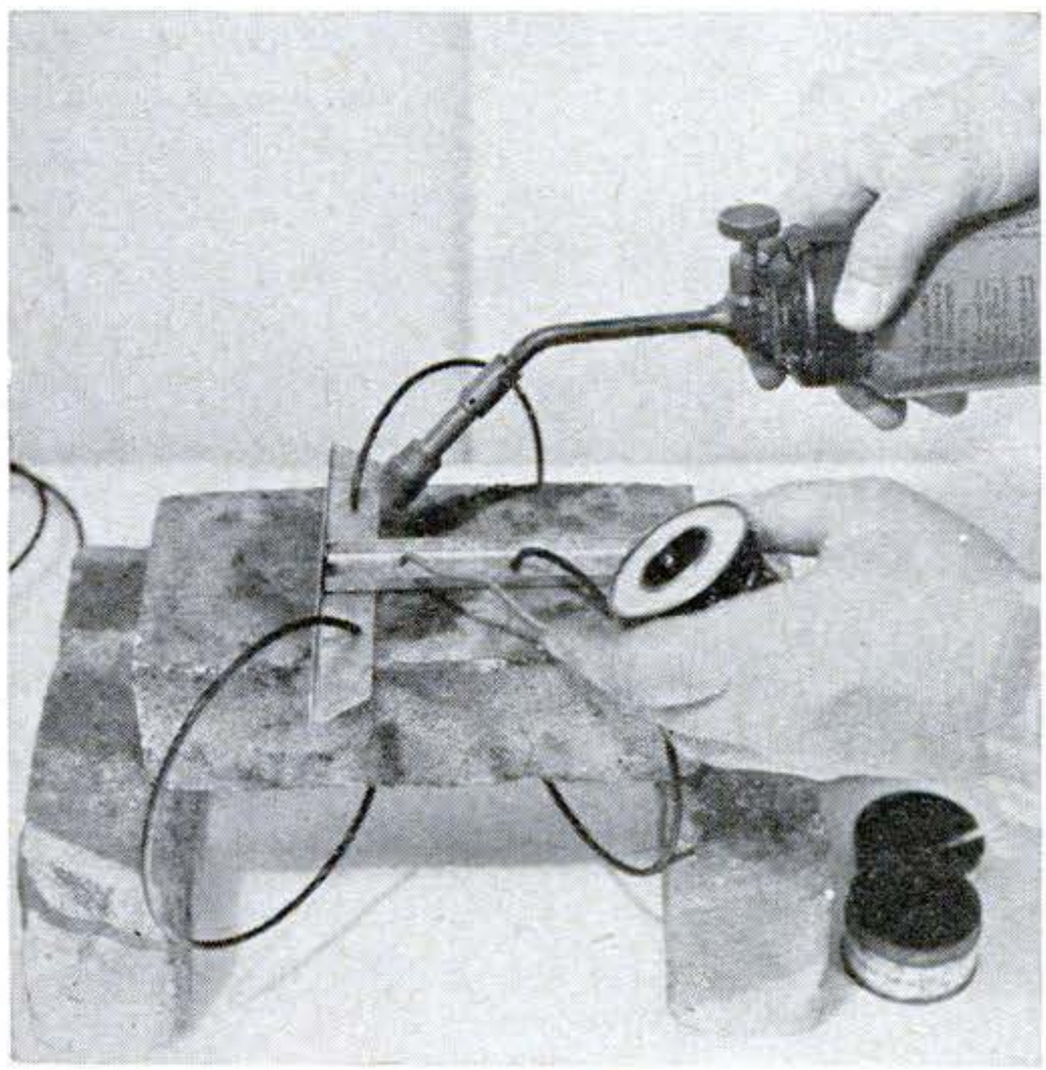
NEW Shop Ideas

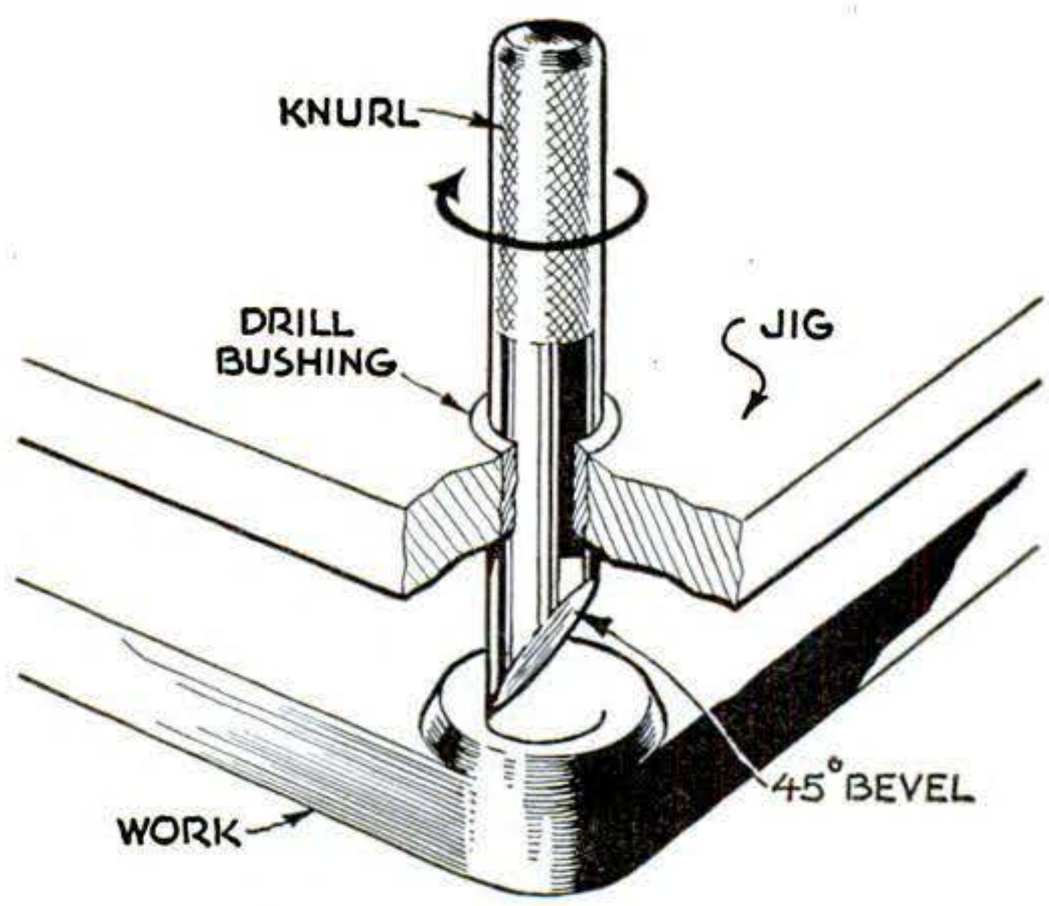


Cutting Rings in a Lathe. When special rings must be cut from solid stock, this trepanning dodge beats boring the inside.

Turn to outside diameter. Then mount a hole saw of the desired inside ring diameter in the tailstock chuck, leaving out the center drill. Use a low spindle speed and run the saw in with the tailstock feed, backing it frequently to let chips clear themselves. Then withdraw the saw as in the photo and cut off the rings with a parting tool. A solid core of material is left, instead of a pile of chips.—*Mac Mackson, Ridgewood, N. J.*

Spring soldering clamps. Unless parts to be soldered or brazed are firmly held, they may shift before the job is done. Ordinary C clamps get in the way and draw too much heat from the work besides. The big clips below, cut from old mattress springs, have a small contact area and so absorb little heat. They apply enough pressure to hold the parts firmly, while leaving them free for any necessary adjustment.



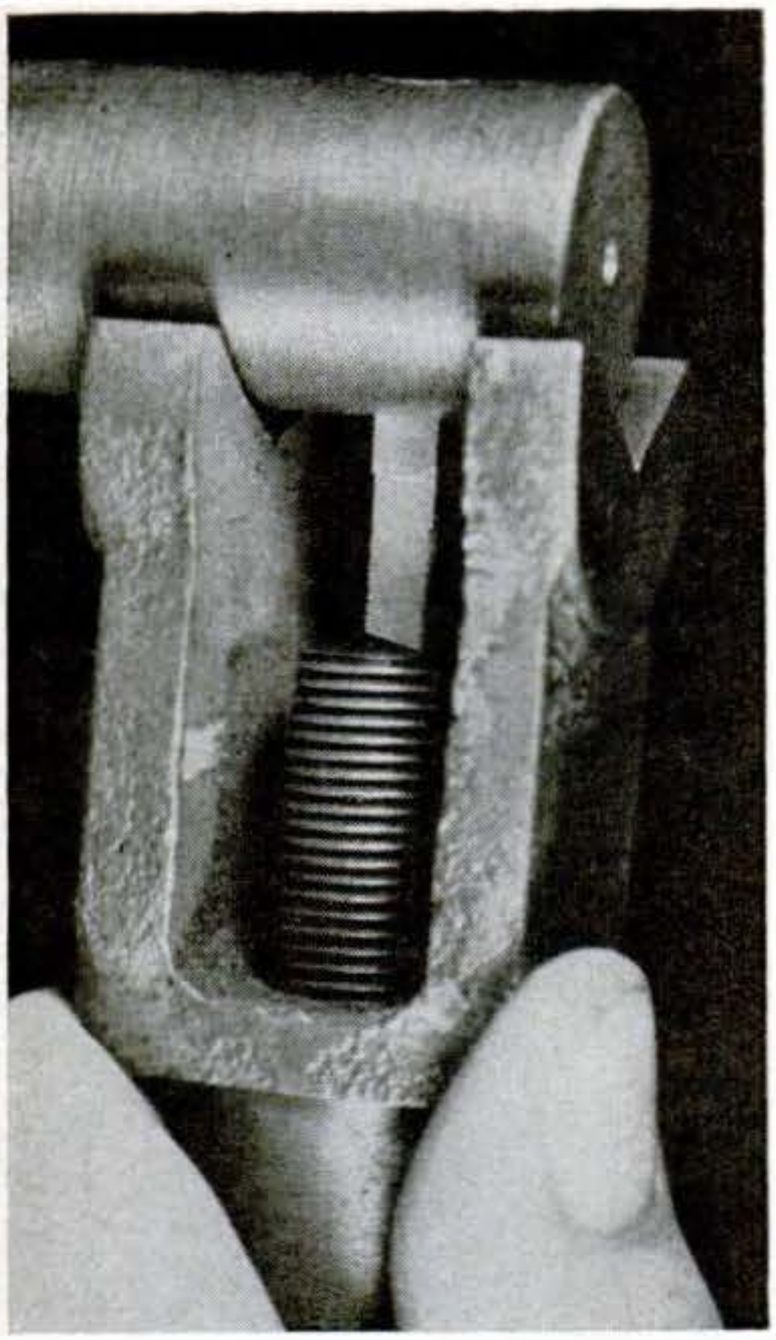


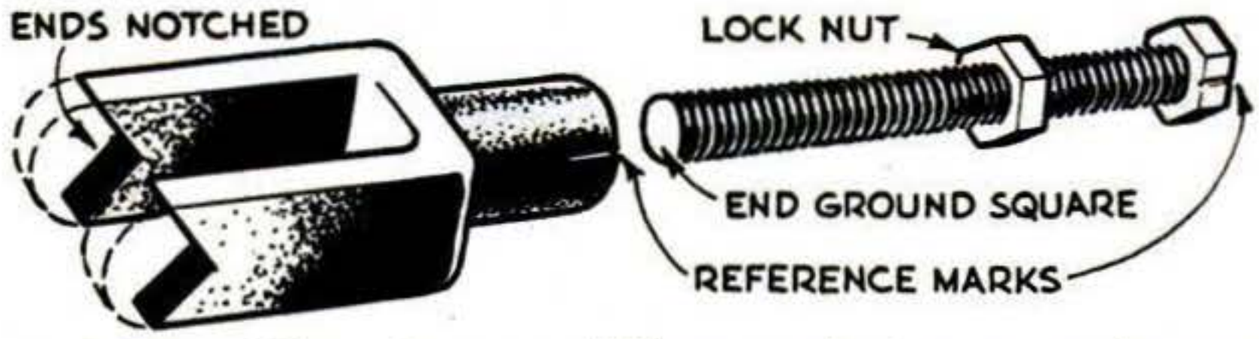
Scribers Test Jig Setup. To check the accuracy of drill jigs, one toolmaker uses scribers made to fit the holes in the jigs. They are inserted and turned with the fingers to scribe circles on the work. This way the jig can be corrected in any necessary detail before a piece is actually drilled and perhaps spoiled.

The scribers are cut from drill rod to a length affording a finger grip, and knurled at one end. The other is cut at 45°, filed sharp at the tip, hardened and tempered.—*Henry Sevcik, Hawthorne, Calif.*

Please turn the page for more shop tips.

Copyrighted material



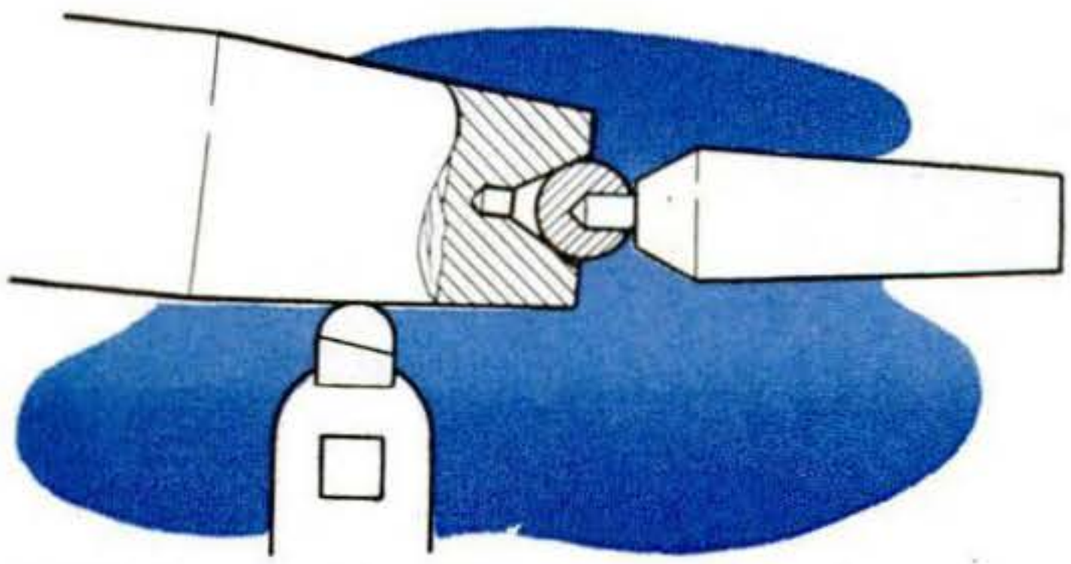


Tool-Resetting Gauge. When replacing or resharpening a bit in a boring bar or fly cutter during a job, you can reset it to the same position with this simple gauge, and avoid the need for making extra trial cuts.

I made the gauge from a small clevis by cutting V notches in the forked end. A nut was turned onto a bolt that fitted the other end, the bolt screwed in and locked with the nut, and its end ground square.

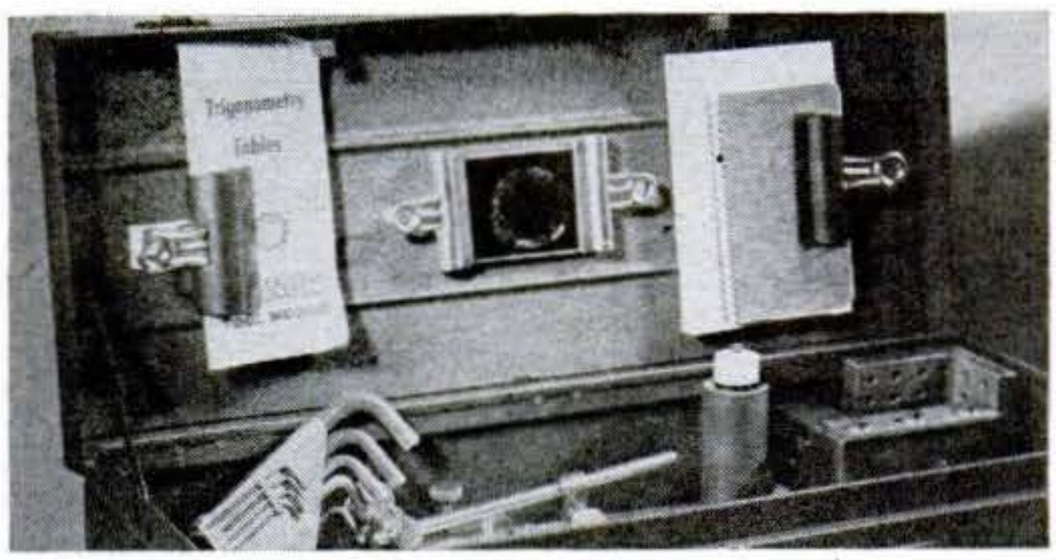
In use, the gauge is held against the tool body, the screw turned in until it touches the bit, and locked. To reset the tool after it has been taken out, the gauge is held as before and the bit pushed out until it touches the end of the screw.

By filing marks on the clevis and the bolthead, and determining the pitch of the screw threads, you can make surprisingly accurate tool adjustments.—*Phil McCafferty, Fort Bliss, Tex.*



Ball Center for Tapers. Although turning tapers with the tailstock set over is standard practice, accuracy is limited because the cone center cannot seat truly in the work.

The ball center shown gives a full bearing surface no matter what the work angle. To make it, anneal a steel bearing ball, drill half through, and reharden it. Push it onto a stud turned on the end of a soft center. Centerdrill work deeply enough to engage the ball.—*Irving Salzer, Baldwin, N.Y.*



Clips Keep It Handy. Note and order books, tables and so forth do not fare well mixed in with tools. Spring-type paper clips bolted underneath a toolbox lid will keep such items clean and safe.

Two clips make it easy to carry a small mirror, a very useful item when you have to see around a corner or into tight spots to reach a part or find a dropped piece, and indispensable for removing something from the eye.—*Gus W. Hall, Brooklyn, N. Y.*

Bent Washer Locks Nut. A simple emergency lock washer can be made by slitting a flat washer and bending it up against the nut. To keep the washer from turning, punch a bit of its edge into a hole in the work.—*Federico Strasser, Santiago de Chile.*

Drill Press Punches Holes. You get cleaner holes in thin sheet metal or fiber by punching than by drilling, but the job can still be done in the drill press.

Clamp a piece of ⅛″ flat steel to the drill-press table and drill a hole the desired size through it. Grind one end of a bit of drill rod or even a nail of the same diameter flat at a slight angle. Chuck this and, with power off, feed the quill down to force the punch through the work.—*Elbert Robberson, Port Washington, N. Y.*

Copyrighted material

Advanced Chevrolet Engineering brings

MORE POWER AND GAS ECONOMY

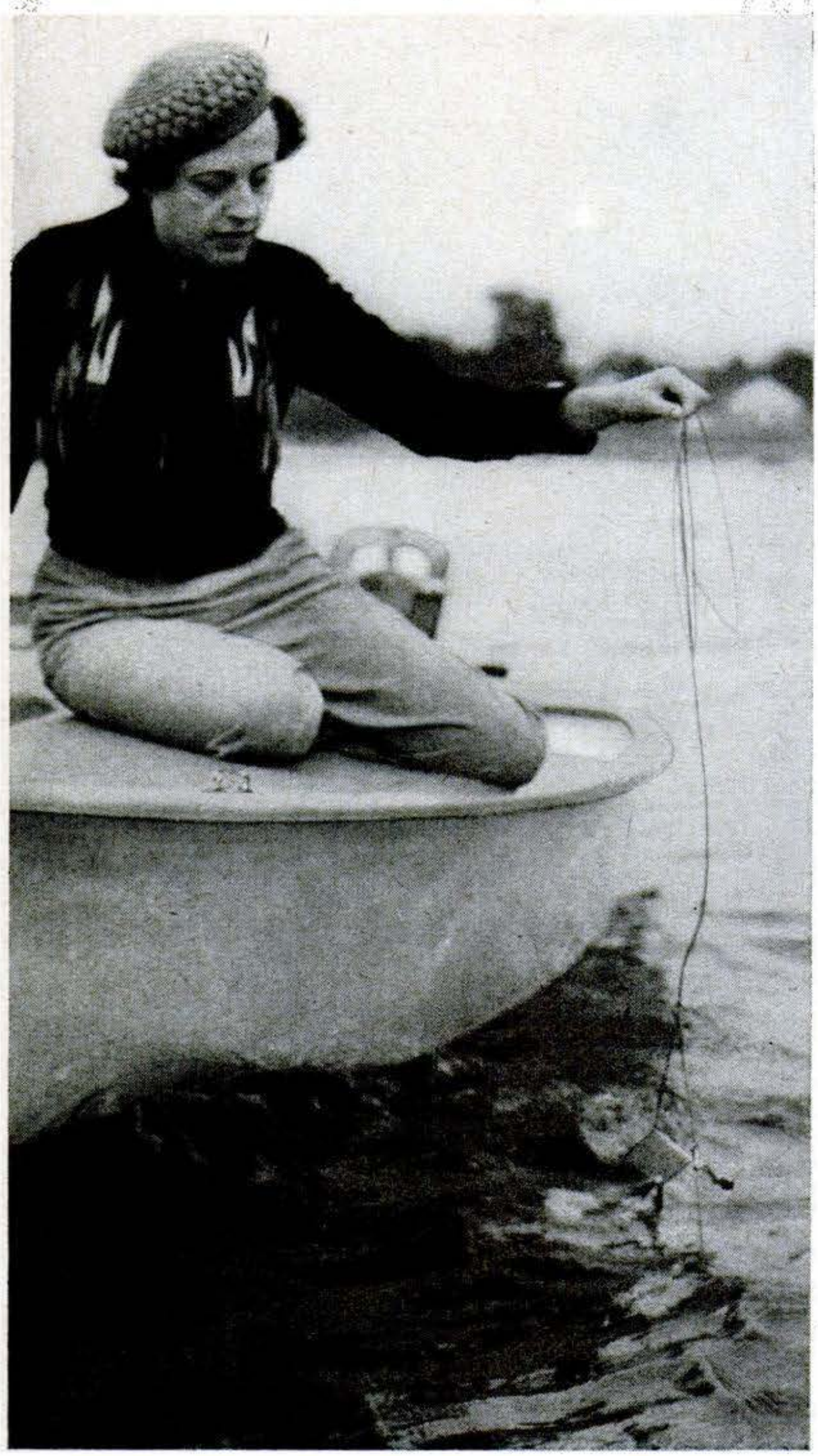
with higher compression valve-in-head engines

Inhale—Squeeze—Burn—Exhale. That's what's done to the fuel mixture in the cylinders of your engine hundreds of times every second you drive. On the efficiency of this cycle depends the amount of power your engine develops and the amount of gasoline consumed in developing it. The famous efficiency of Chevrolet engines is the result of forty years of progress in valve-in-head design. Valve-in-head engines are more efficient because they draw more fuel mixture into the cylinders, retain more power-producing heat, and expel fumes more thoroughly and quickly. With Chevrolet's 7.5 to 1 compression ratio—highest in leading low-priced cars—the fuel is squeezed harder and the push of expanding gases on the pistons is more powerful.

Chevrolet's dual automatic spark advance provides for ignition of the fuel precisely when it is required, and scientifically shaped combustion chambers assure smooth, knock-free burning—even with standard gasoline—with a blue flame that indicates complete combustion of the fuel. With Chevrolet engines, you get exceptional power for an extremely low operating cost. The "Blue Flame 115," used in gearshift models, develops 115 h.p. The "Blue Flame 125" teamed with Powerglide as an extra-cost option, develops 125 h.p. See your Chevrolet dealer. Try a Chevrolet with either engine. You'll like its fine performance and money-saving gas mileage. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

EVER FINER ENGINEERING CHEVROLET EVER FINER CHEVROLETS

Copyrighted material



Tin Fish Below Boat Warns of Shallows

This homemade sounding device pops up if it hits bottom. It may keep you from knocking a hole in the hull or winding the prop around a rock.

WITH this mechanical pilot fish swimming under your boat, you can cruise anywhere and never fear hitting bottom. Made from 10-cents' worth of materials, it is an adaptation of the Navy paravane, or underwater kite, used to cut mine cables.

It can be set to stream at speeds of two to 10 knots, about as fast as you'd want to navigate unfamiliar waters. As long as all is clear at the depth it is set for, it stays under water. But if the feeler strikes bottom, the gadget flips over and streaks to the surface to warn you of danger below.

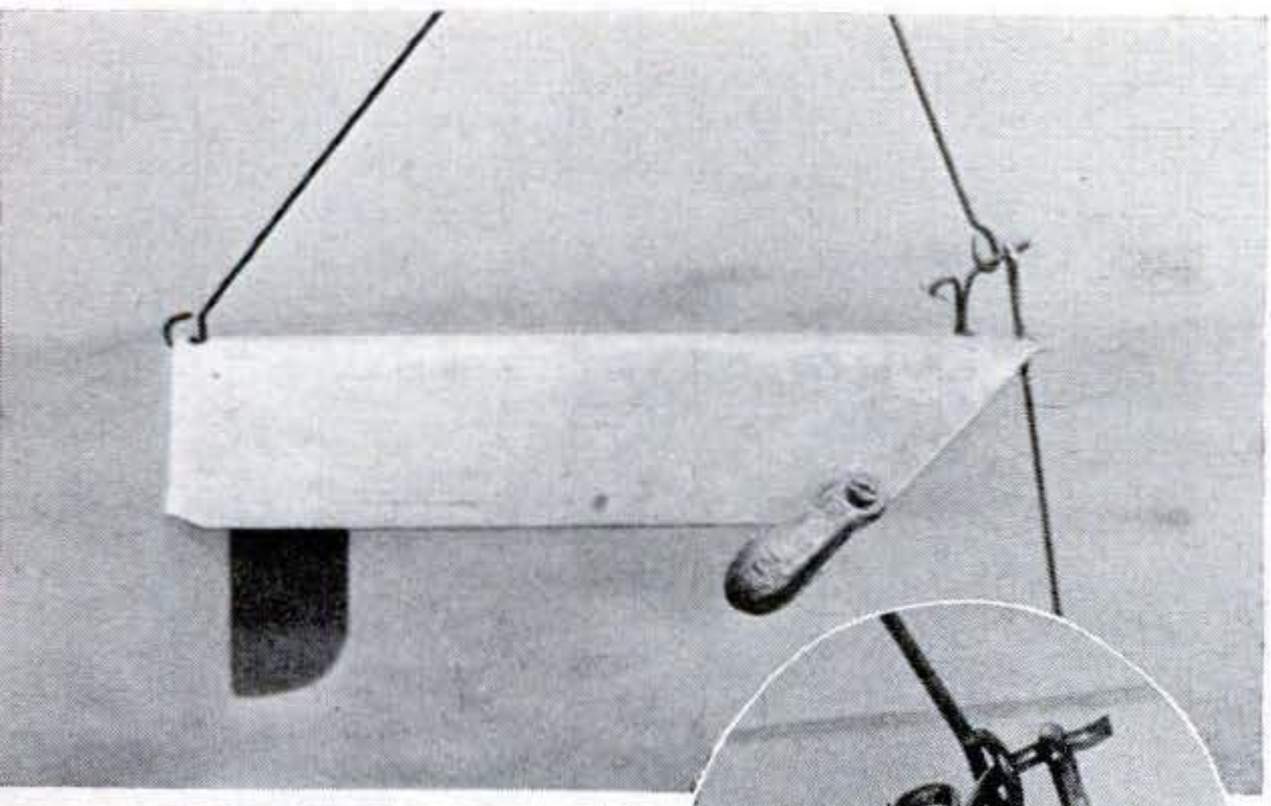
Cut the body and rudder from sheet brass or aluminum. Drill No. 6 holes where indicated. Bend both members along the dotted lines. Rivet the rudder on; then bend it farther until it bisects the wing angle. Make the other parts as shown in the photos.

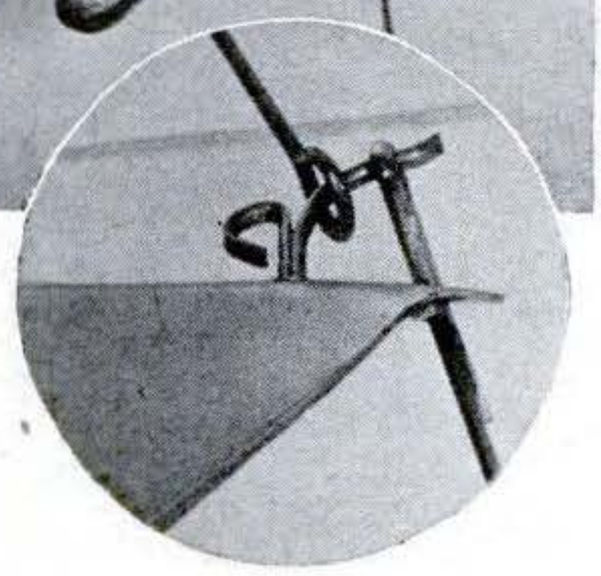
The device can be painted a bright yellow or vermilion to make it easier to spot. Attach a swivel to the ring linking the two bridle wires. A length of Monel leader wire, which should be 1½ times as long as the depth at which you want warning, makes the best cable.

Set the feeler on the latch and, when under way, drop the paravane in from the forward part of the boat. The end of the bowsprit is the best spot on a sailboat, but any point off the bow will do, as long as the device will be instantly visible to the helmsman or lookout if it surfaces. An oar or boat hook can be used to hold the cable out from the hull.

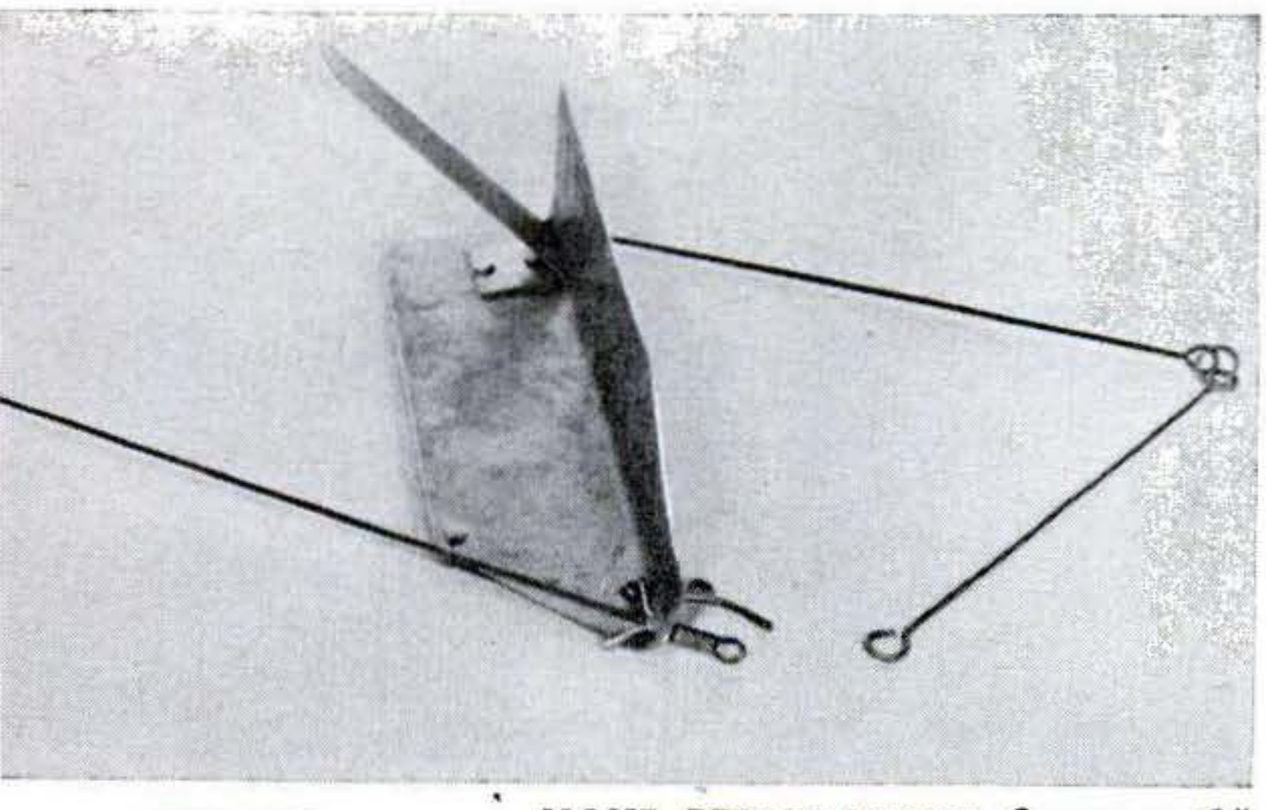
Be careful not to let the first contact with the water trip the latch. Watch the paravane when it is just below the surface; it should stream back at about 45° and with a downward pull of two to 10 lb. If it tends to dive or leap, change its angle by shortening or lengthening the front bridle wire a little at a time. Then drop it to cable depth and your 10-cent sonar is on the job.—*Elbert Robberson, Port Washington, N.Y.*

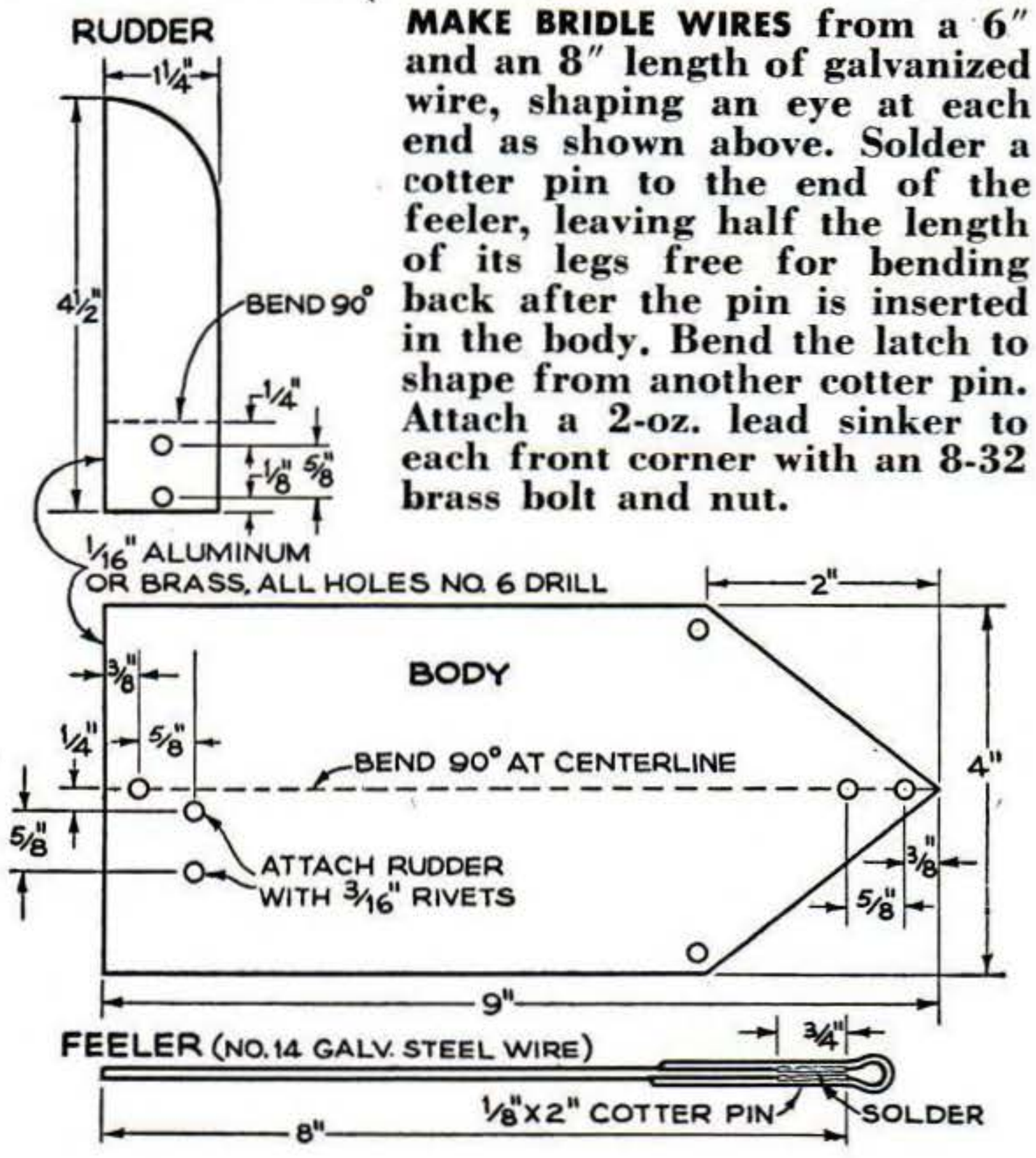
Copyrighted material





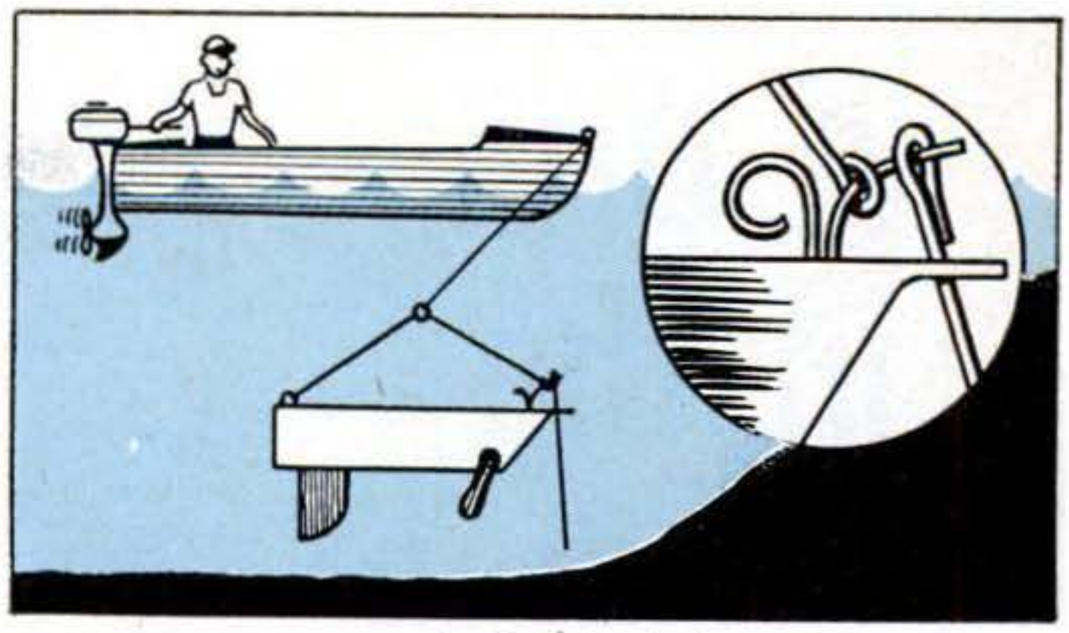
TWO WEIGHTS hold the head down. The forward bridle is adjusted to make the body exert a downward pull. Bend latch so that it is secure but free to move.



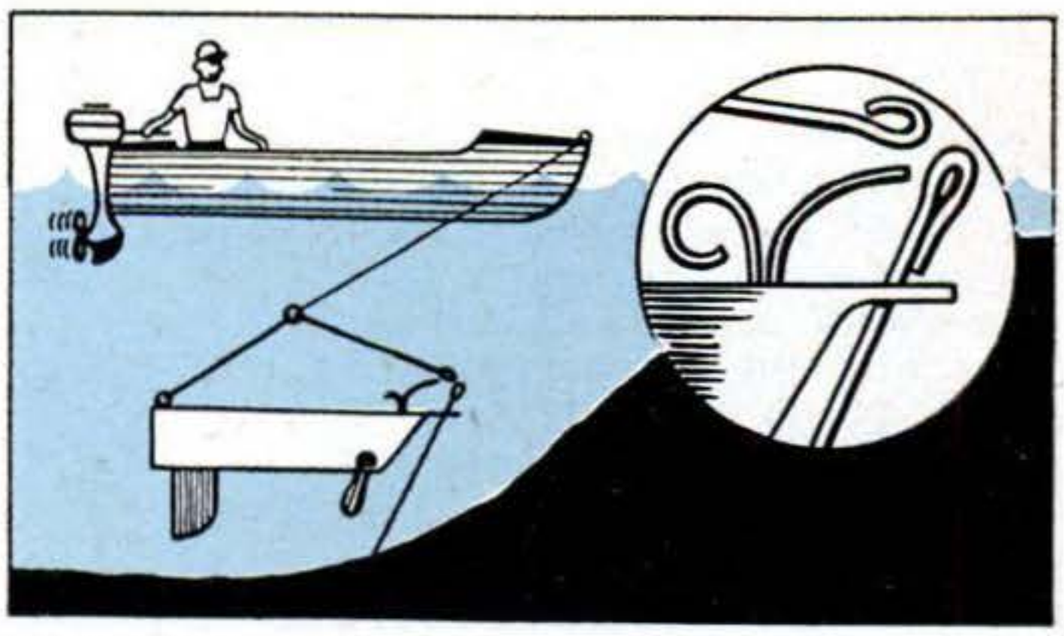


MAKE BRIDLE WIRES from a 6" and an 8" length of galvanized wire, shaping an eye at each end as shown above. Solder a cotter pin to the end of the feeler, leaving half the length of its legs free for bending back after the pin is inserted in the body. Bend the latch to shape from another cotter pin. Attach a 2-oz. lead sinker to each front corner with an 8-32 brass bolt and nut.

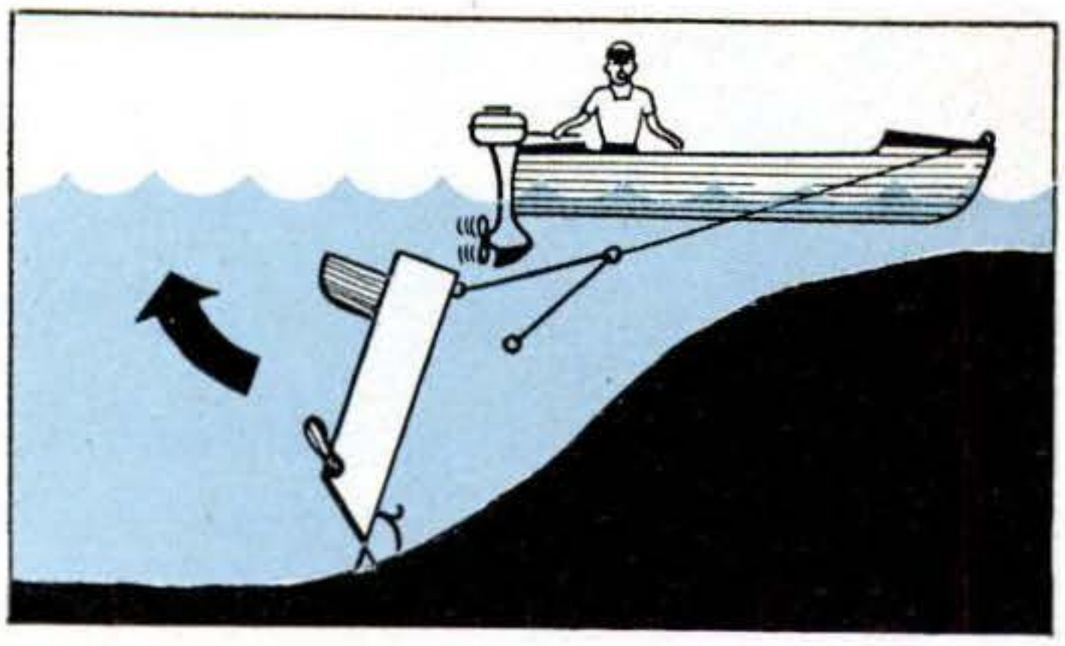
HOW IT WORKS



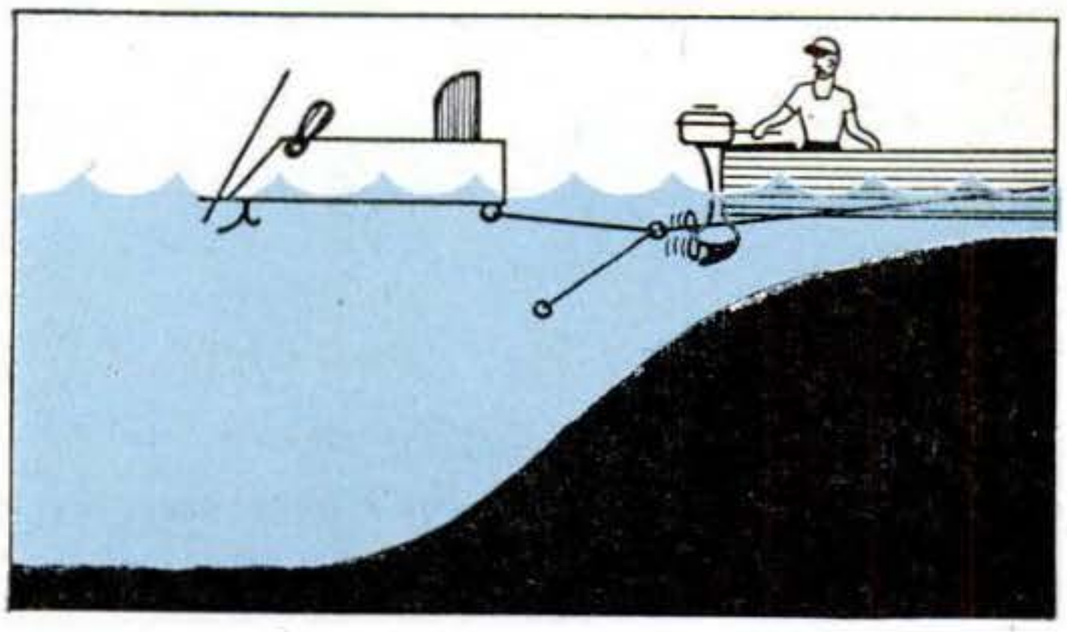
REAR BRIDLE WIRE is hooked fast. The front one is held on the latch by the eye on the feeler. Device streams like this, feeler down.



HITTING BOTTOM, feeler is kicked back. Its eye jumps forward, off the latch. With latch free to tip upward, front bridle slips off.



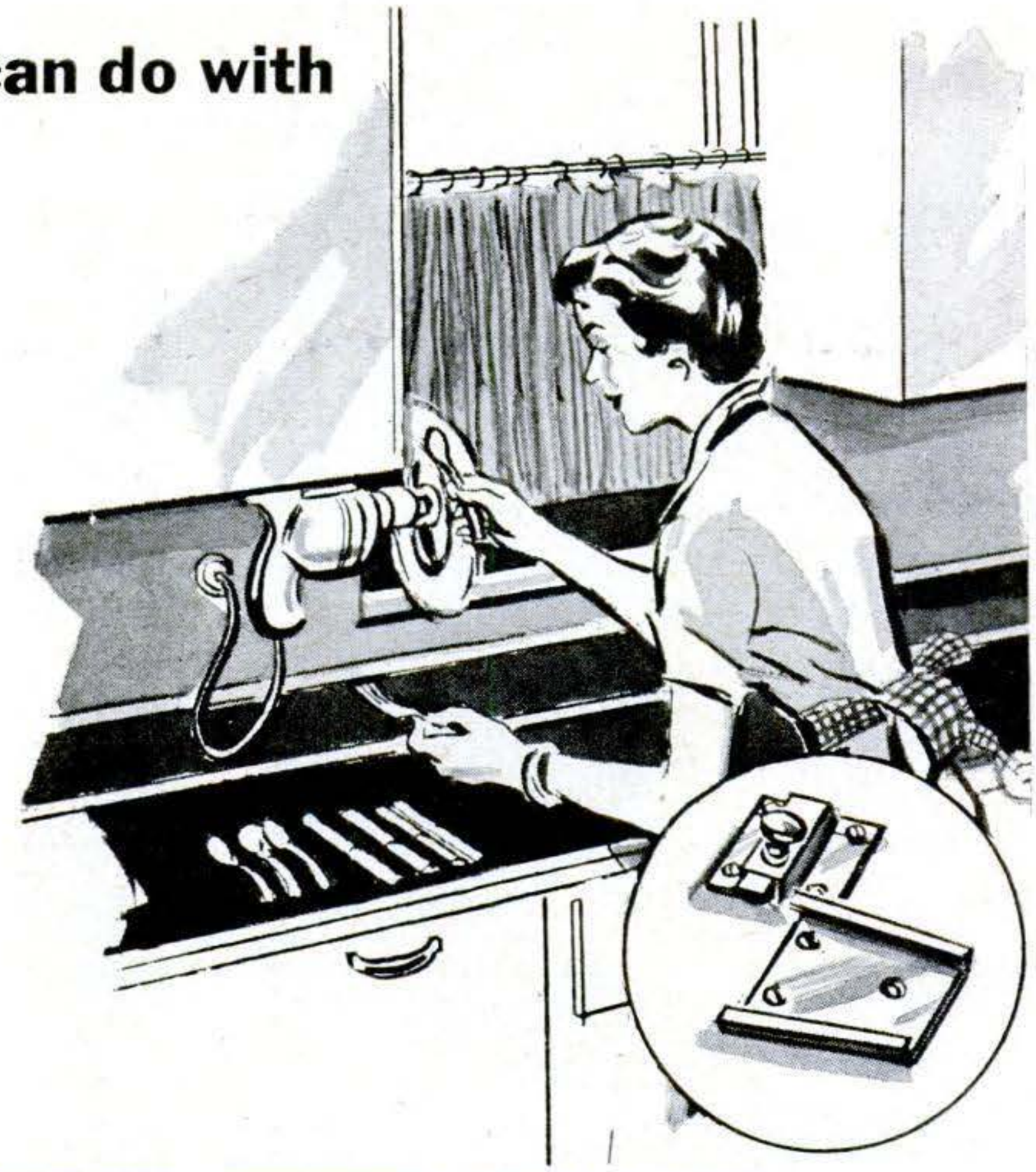
WEIGHTED FRONT DROPS, and paravane, now towed only by the rear bridle wire, instantly does a complete back flip in the water.



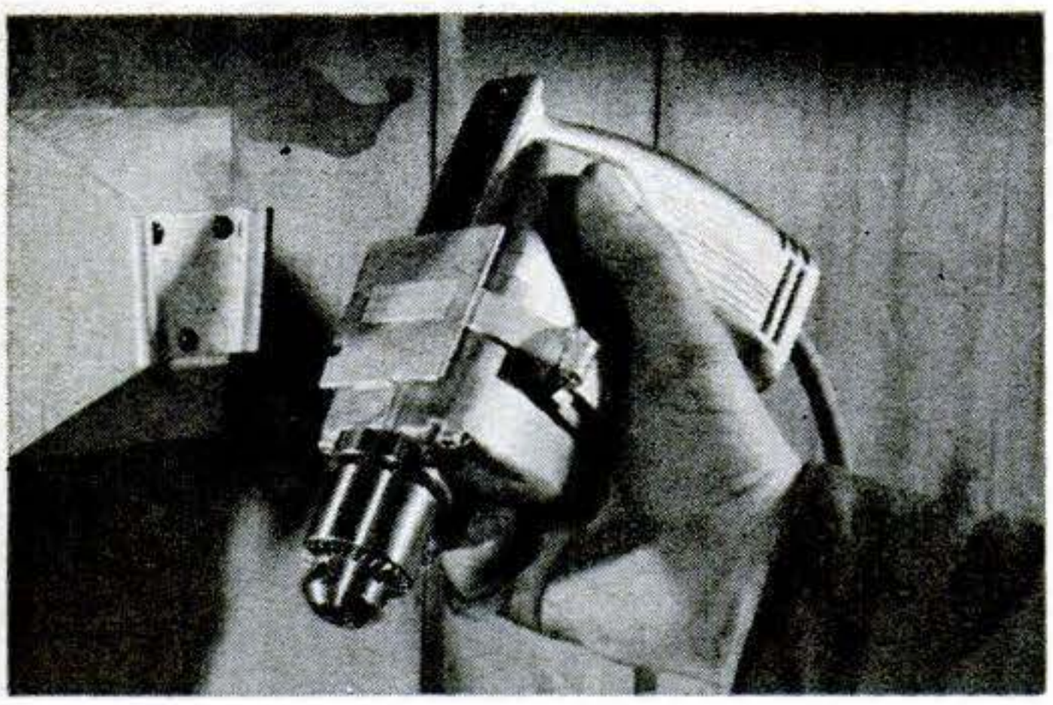
WINGS UP, the paravane now gets a lift from its movement through the water. It shoots up, skimming on the surface to warn the pilot.

Look what you can do with

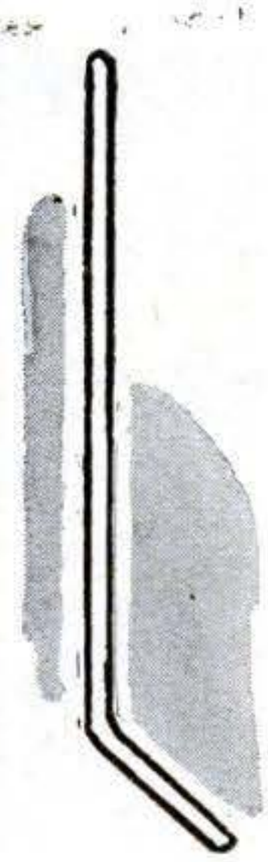
A Drill in the Kitchen



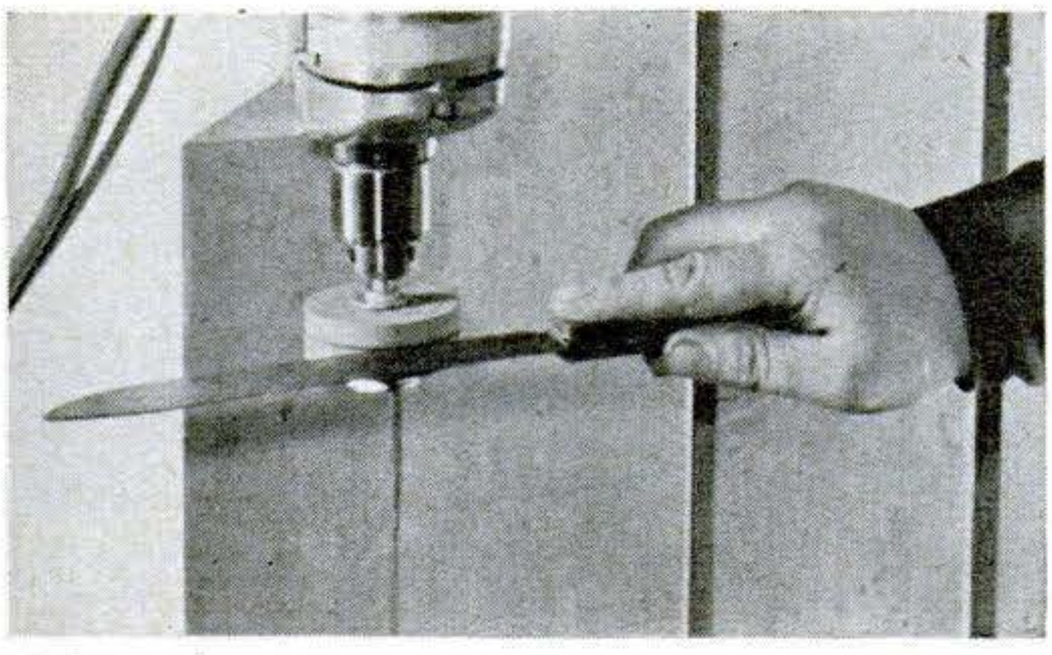
MOUNTED UNDER CABINET near sink, ¼″ electric drill with buffer wheel will put a high shine on silver, chrome and copper ware. Fitted with wire cup brush, it also makes short work of pot-scouring chores. Use can-opener bracket to hold drill, as for wall clip below, but add spring cupboard latch (inset at right) to lock drill so it can't slide out.



CAN-OPENER BRACKET makes simple slip-in clip to hold drill on wall. Bracket is mounted on 1¼″-thick wood block so mixer blade will clear wall. Metal plate on drill is hacksawed to shape of bracket from heavy sheet (cover plate from old electrical junction box is just right). Plate is then slotted and strapped on with large truck-type hose clamp.

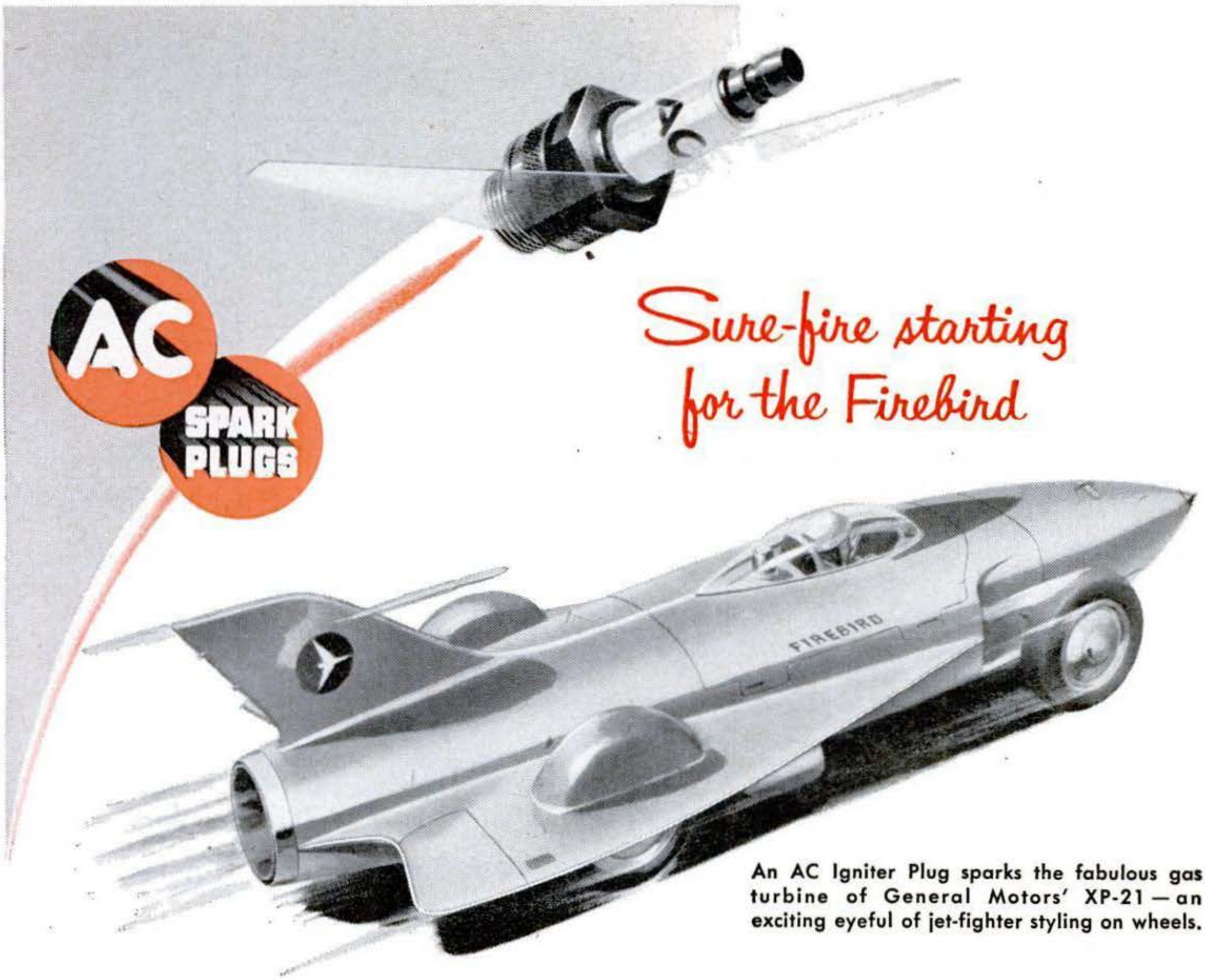


COOL SUMMER MILK SHAKES are mixed in a jiffy with drill mounted on kitchen wall this way. Drill can also be used as hand mixer for beating eggs and batters in large bowls. Beater can be short rod bent at tip or small commercial impeller available at hardware stores.



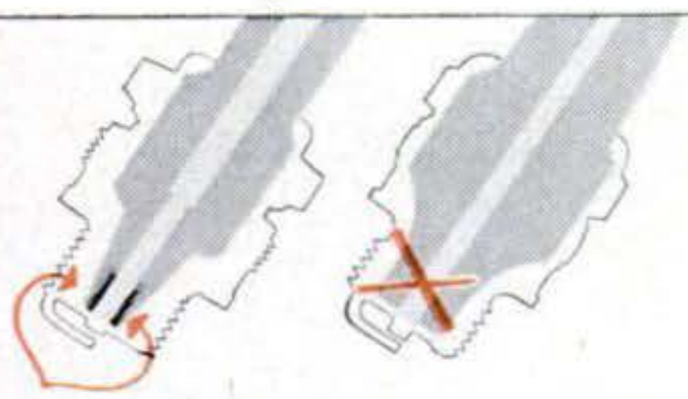
KNIFE SHARPENER puts a quick, keen edge on knives without hand grinding. Sharpener, made by Mall Tool Co., fits ¼″ chucks, has a groove that you just slip knife into.

Copyrighted material



An AC Igniter Plug sparks the fabulous gas turbine of General Motors' XP-21 — an exciting eyeful of jet-fighter styling on wheels.

A new set of AC's brings easier starting and smoother firing to any car's engine



AC's longer, thinner insulator tip stays cleaner, boosts power, saves gas

AC's long, thin, recessed insulator tips heat up more rapidly to burn away deposits which would otherwise form at the tips to cause pre-ignition or misfiring. This is an exclusive AC feature.

Your car should start quickly, idle quietly, accelerate smoothly. If it isn't behaving like that, take a few minutes to have your spark plugs checked. If they're badly worn you'll find that a new set of AC Spark Plugs will go a long way toward restoring new-car performance — may give you up to 10% more power and fuel economy as much as one gallon in ten.

You see — AC Spark Plugs have many patented features that insure power-boosting, gas-saving, top-flight performance! And note: there's an AC Spark Plug engineered to General Motors standards specifically for the car *you* drive.

AC SPARK PLUG DIVISION GM GENERAL MOTORS GENERAL MOTORS CORPORATION

STANDARD FACTORY EQUIPMENT ON CHEVROLET • PONTIAC • OLDSMOBILE • BUICK • CADILLAC • GMC

Copyrighted material

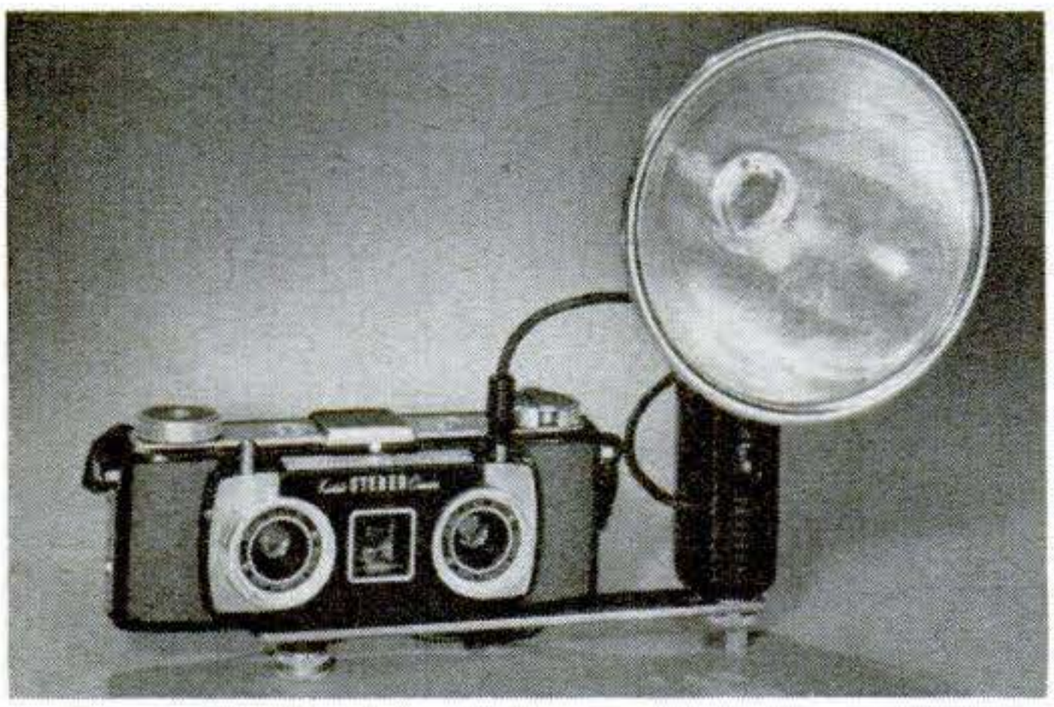
Sliding Cover Protects the Lens of New Reflex Camera

A SLIDING lens shield is a feature of this new Anscoflex. Pushing up the slide simultaneously raises a folding light shield around the view finder. The reverse action closes the camera.

A built-in shutter lock prevents double exposures. The camera makes 12 2¼"-by-2¼" pictures on 620 film. A lock-on flash attachment comes as an accessory.

Photo Trays Rock on a Cord

A LENGTH of insulated electric wire (see arrow) placed under the middle of photographic enlarging trays makes it easy to keep the chemicals flowing back and forth just enough for rapid, even development. *—Harrison Neustadt, NYC.*



New Stereo Sets Own Exposure

A BUILT-IN exposure calculator is a feature of this new Kodak stereo camera. When you select the desired shutter speed, the calculator automatically sets the lens diaphragm for bright, hazy, or cloudy-bright lighting.

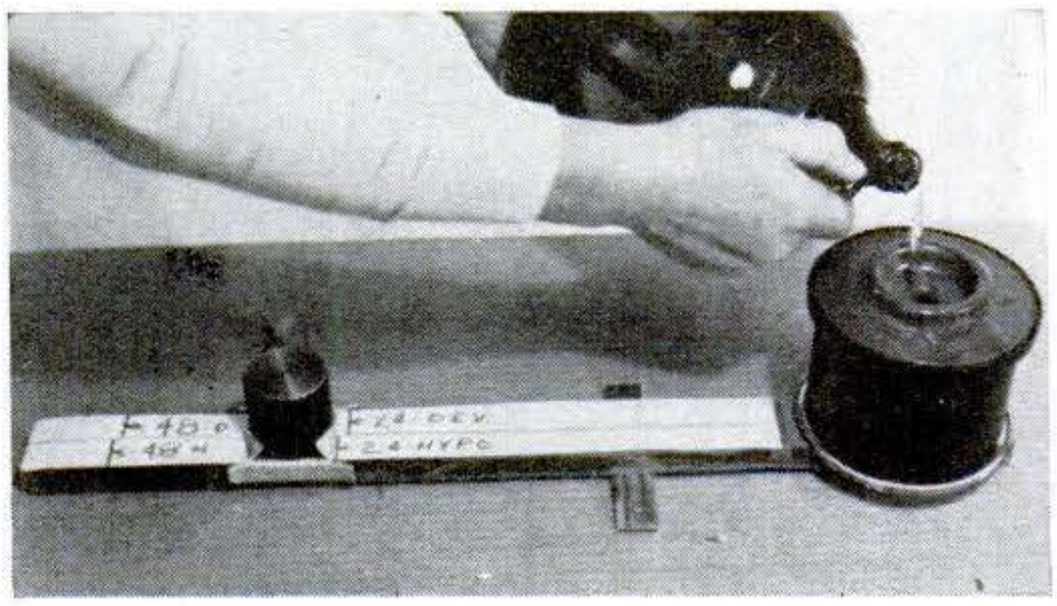
Eastman has also incorporated another aid to simplified photography in the camera. This is a distance indicator that provides focusing points for close-ups, groups and scenes. The camera will be marketed this summer.

Balance Measures Developer

INSTEAD of using a graduate to measure the developer needed for various film sizes in a roll-film tank, use the homemade balance below and just pour in the liquid.

The balance was made from a piece of one-by-two stock with a coffee-can lid for a tray. A fulcrum was provided by screwing a piece of counter-edging to the bottom 6" from the tray center. Any piece of metal weighing about a pound will serve as a weight. It can be clamped in a tin-formed slipper moved along the top of the arm.

The arm must be calibrated experimentally for the desired amount of developer and hypo. As these have different specific gravities, a mark must be made for each. *—Elbert Robberson, Port Washington, N.Y.*



Copyrighted material

CHAN NEL LOCK

The finest line of tools you can buy!

YOU'LL find a complete selection of pliers in the Channellock line — a plier for every job . . . at work and in the home. Don't take a substitute when you shop for pliers — Only Champion DeArment make Channellock . . . patented features assure you of the finest line of tools you can buy.

THE PLIER DESIGN THAT OBSOLETES ALL OTHERS

CHAMPION DEARMENT TOOL CO.

MEADVILLE, PENNSYLVANIA

Copyrighted material

No. 407 GRIPPING PLIER

Length 7". Capacity 1/8" to 5/8". Two adjustments. Knurled grips.

This **No. 407** plier is primarily intended for battery work. The self-gripping feature insures a positive grip on acid corroded and mutilated terminal nuts. Its adjustable feature also makes it indispensable for many other kinds of work. Polished steel finish.

No. 410 GRIPPING PLIER

Length 9 1/2". Capacity 3/16" to 1 1/8". Four adjustments.

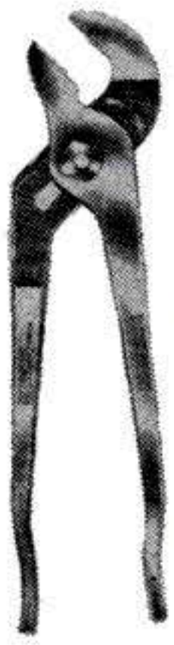
Our **No. 410** is a heavy-duty self-gripping plier which will hold work of any shape with a positive pipe wrench grip. Will exceed a pipe wrench in usefulness because of its light weight and streamlined design. Polished steel finish.

No. 417 GENERAL UTILITY PLIER

Length 7". Capacity 7/8". Three adjustments. Knurled grips.

The **No. 417** is a heavy-duty plier with a gripping power many times greater than the ordinary slip-joint plier. Polished steel finish. Its superiority can only be appreciated by actual use.

The NEW No. 420 PUMP PLIER



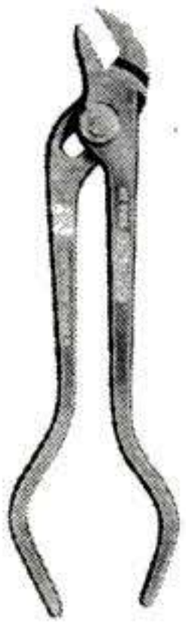
Length 9 1/2". Capacity 1 3/4". Five adjustments.

The wide range of adjustments of the **No. 420** Pump Plier makes it adaptable to a multitude of uses. New strength has been added by the patented design of the tension edge. Interlocking channels and lugs prevent slipping. Wide base lugs provide maximum cross section strength.

Ask your hardware dealer to show you the complete CHANNELLOCK *line*

SELECT THE PLIER YOU NEED

No. 424 IGNITION PLIER



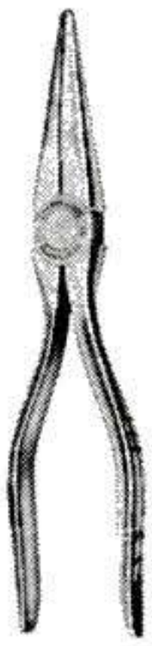
Length 4 1/2". Capacity 1/2". Four adjustments.

This **No. 424** ignition plier incorporates the Channellock adjustment feature in order to eliminate wear on the joint bolt and lengthen the life of the tool. A midget plier. Polished steel finish.

No. 307 BATTERY PLIER LAP JOINT

Length 7". Capacity 1/4" to 5/8". Blue finish.

No. 317 1/2 LONG NOSE PLIER with Side-Cutter



Length 7 1/2". Polished steel finish. Knurled grips. **No. 3017 1/2** same model without side cutter. Point, 3/32" round.

No. 326 LONG NOSE PLIER with Side-Cutter

Length 6". Polished steel finish. Knurled grips. **No. 3026,** same model without side-cutter. Point 3/32" round.

No. 337 DIAGONAL CUTTING PLIER Lap Joint

Length 7". Weight 6 lbs. per doz. Polished steel finish. Knurled grips.

No. 348 1/2 LINEMEN'S PLIER Rounded Nose

Polished steel finish. Knurled grips. Side-cutter.

No.	Size
346	6"
347	7"
348 1/2	8 1/2"

Only CHAMPION DEARMENT MAKES CHANNELLOCK

Copyrighted material

No. 3048 1/2 LINEMEN'S Bevel Nose

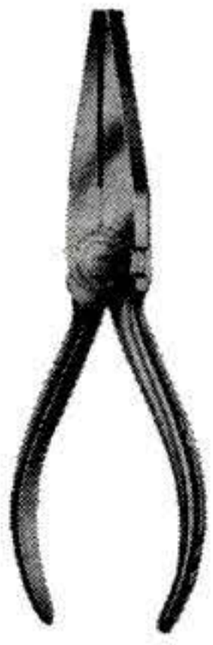
Polished steel finish. Knurled grips. Side-cutter.

No.	Size
3046	6"
3047	7"
3048 1/2	8 1/2"

No. 356 END CUTTER

Length 6". Polished steel finish.

No. 366 FLAT-NOSE PLIER with Side-Cutter



Length 6". Polished steel finish. Knurled grips. **No. 3066,** same model without side-cutter.

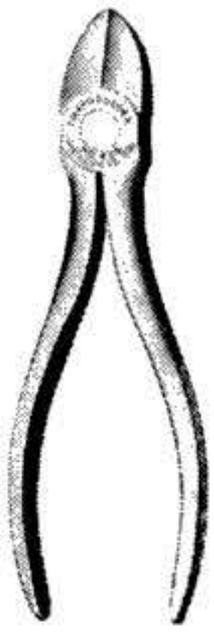
No. 378 LONG REACH DUCK-BILL PLIER

Length 8". Polished steel finish.

No. 3078 LONG REACH NEEDLE-NOSE PLIER

Length 8". Polished steel finish.

No. 436 DIAGONAL CUTTING PLIER Box Joint



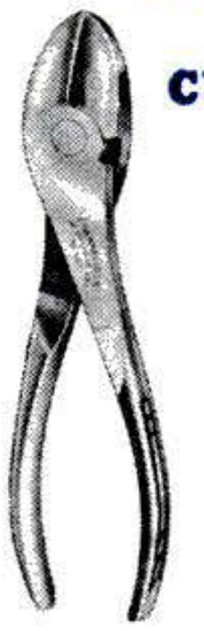
Length 6". Polished steel finish. Knurled grips. **No. 435,** same model 5" long.

HE WILL HAVE ONE FOR EVERY JOB

No. 437 DIAGONAL CUTTING PLIER Box Joint

Length 7". Polished steel finish. Knurled grips. A popular plier with automobile and airplane mechanics.

No. 447 CURVED DIAGONAL CUTTING PLIER Lap Joint



Length 7". Polished steel finish.

No. 516 SLIP-JOINT PLIER Thin Nose

Length 6". Polished steel finish. Knurled grips.

No. 537 SLIP-JOINT PLIER with Side-Cutter

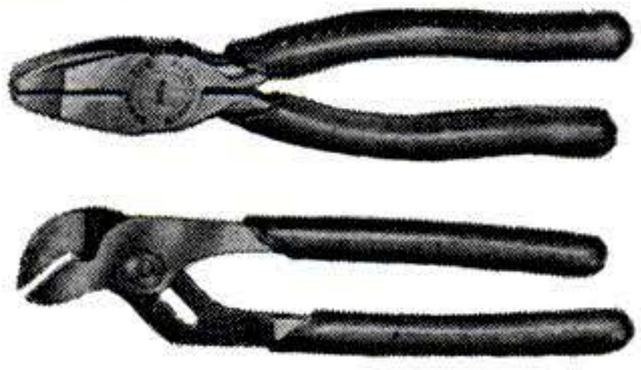
Length 7". Polished steel finish. Knurled grips.

No. 568 ANGLE-NOSE PLIER Slip-Joint

Length 8". Polished steel finish. Knurled grips.

"SUPERIOR" PLASTIC GRIPS FOR PLIERS

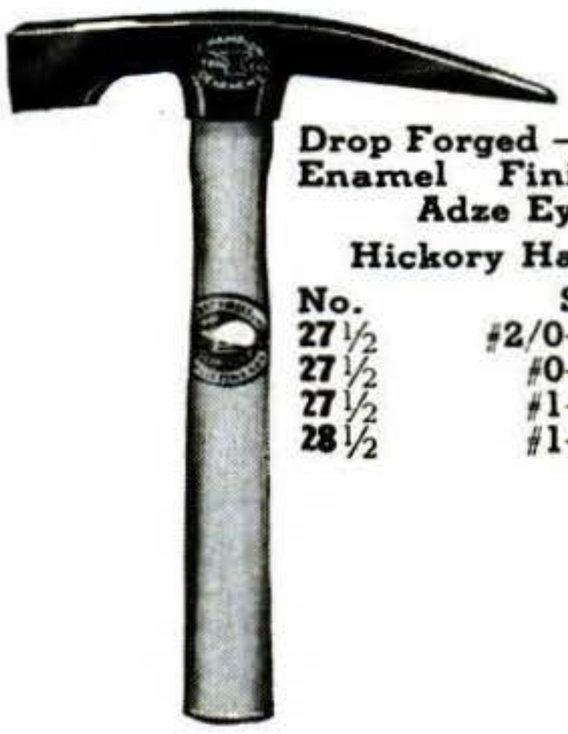
Made of tough, durable plastic material. Easy to install, full instructions with each pair. Plier loss reduced as light blue color makes pliers easy to locate Gives maximum handle-grip comfort.



CHAMPION DEARMENT TOOL CO • MEADVILLE, PA.

Copyrighted material

No. 27 1/2 BRICK HAMMER



Drop Forged — Black Enamel Finish
Adze Eye
Hickory Handle

No.	Size
27 1/2	#2/0—10 oz.
27 1/2	#0—18 oz.
27 1/2	#1—24 oz.
28 1/2	#1—24 oz.

No. 88 LONG NECK ELECTRICIAN'S HAMMER

Designed specially for working over conduit and nailing junction boxes. Full Polished, Black Neck. Weight, 18 oz.

No. 451 1/2 "Our Pride" NAIL HAMMER

Special Analysis Steel. Properly heat-treated to insure maximum durability for claws, face and body. Square face provides wider striking surface at edge of face and enables easier driving of nails close to abutting surface and in corners. Claws are clean-cut and sharp for easy gripping of nails of all sizes. Lacquered handle is moisture proof, full octagon, nonslipping, and easy on the hands. Weight, 16 oz.

FOR HIGHEST QUALITY TOOLS BUY CHANNELLOCK

HERE are a few of the many items in the complete Champion-DeArment Channellock line. On these pages you see the result of three quarters of a century experience in producing highest quality tools. Send for our Catalog PS-6 for complete information on the full Champion DeArment line of fine tools.

BALL PIEN HAMMERS

No. 20
Full Polished Finish
(Painted Neck)
No. 20 1/2
Black Enamel Finish
Dropped Forged
Hickory Handle
This hammer available from 2 oz. to 3 lb.

BRICK CHISELS AND SETS

Drop Forged — Black Enamel Finish

No.	Size
52 Single Bevel	3"
	3 1/2"
	4"
53 Double Bevel	3"
	3 1/2"
	4"

No. 140 WRECKING BAR

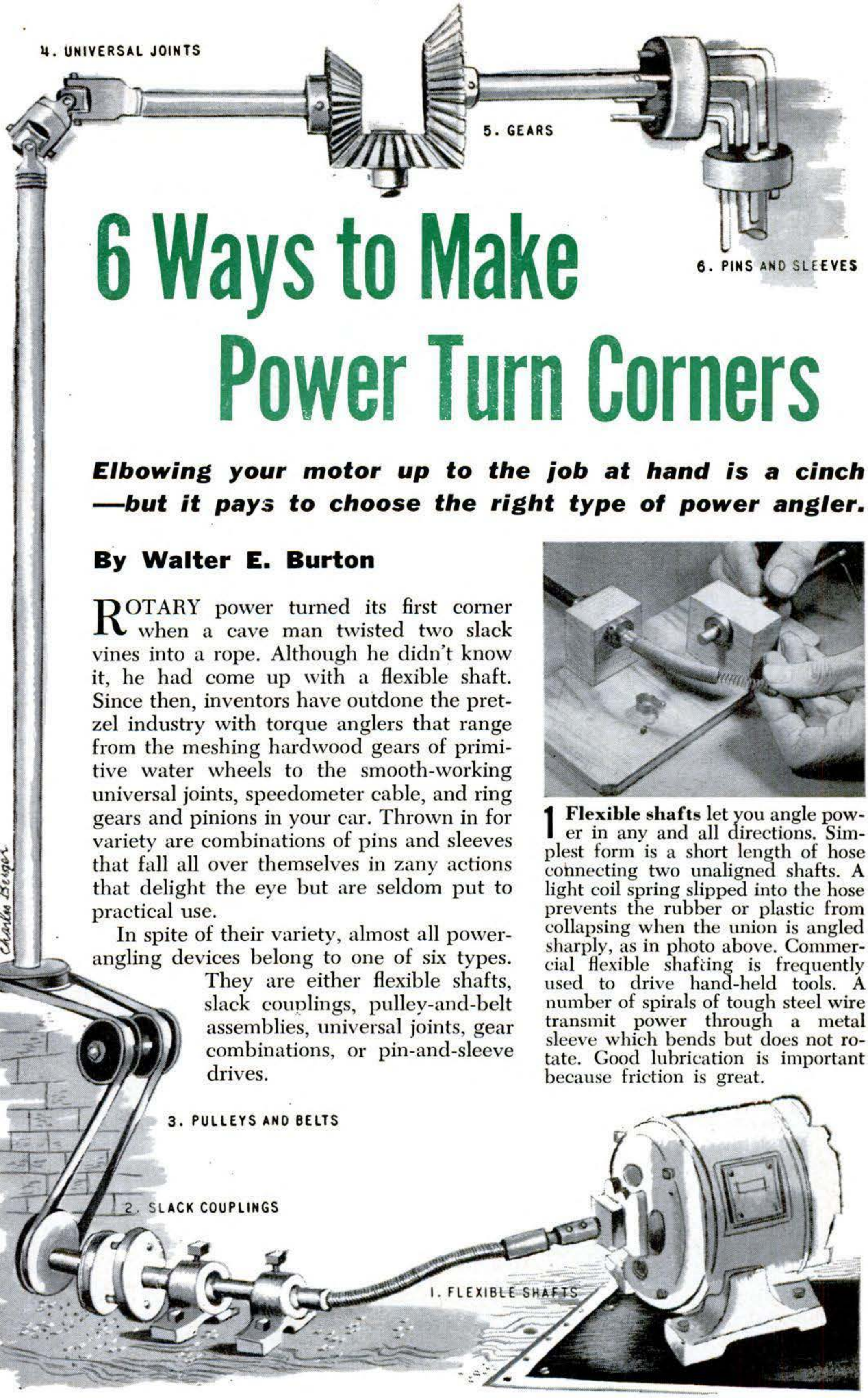
Forged from High-grade Hexagon Tool Steel . . . Heat Treated for Maximum Strength . . . Tips Hardened to Resist Wear . . . Pry End Carefully Ground . . . Claw End Separately Forged and Ground Just Like a Nail Hammer Claw . . . Clean . . . Sharp . . . "Nipper- Grip" Claw for Easy Gripping of Nails of All Sizes. Distinctively Painted Red and Black Lacquer. 18, 24 and 30 inch lengths.

No. 148 HEAVY DUTY NIPPERS

This "Heavy Duty" Nipper is specially designed for Concrete Form Builders, Carpenters, Mechanics, Farmers and for Miscellaneous work. It will easily cut large nails, small spikes, form tie wires, reinforcement wire, etc. Drop forged from special analysis steel, and designed to give greatest leverage and strength. The stops prevent dulling of cutting edges and provide adjustment when edges have worn. Polished head. Painted "T" handles. Cutting edges hand filed. Available in 8, 10 & 14 inch lengths.

CHAMPION DEARMENT TOOL CO • MEADVILLE, PA.

Copyrighted material



6 Ways to Make Power Turn Corners

Elbowing your motor up to the job at hand is a cinch —but it pays to choose the right type of power angler.

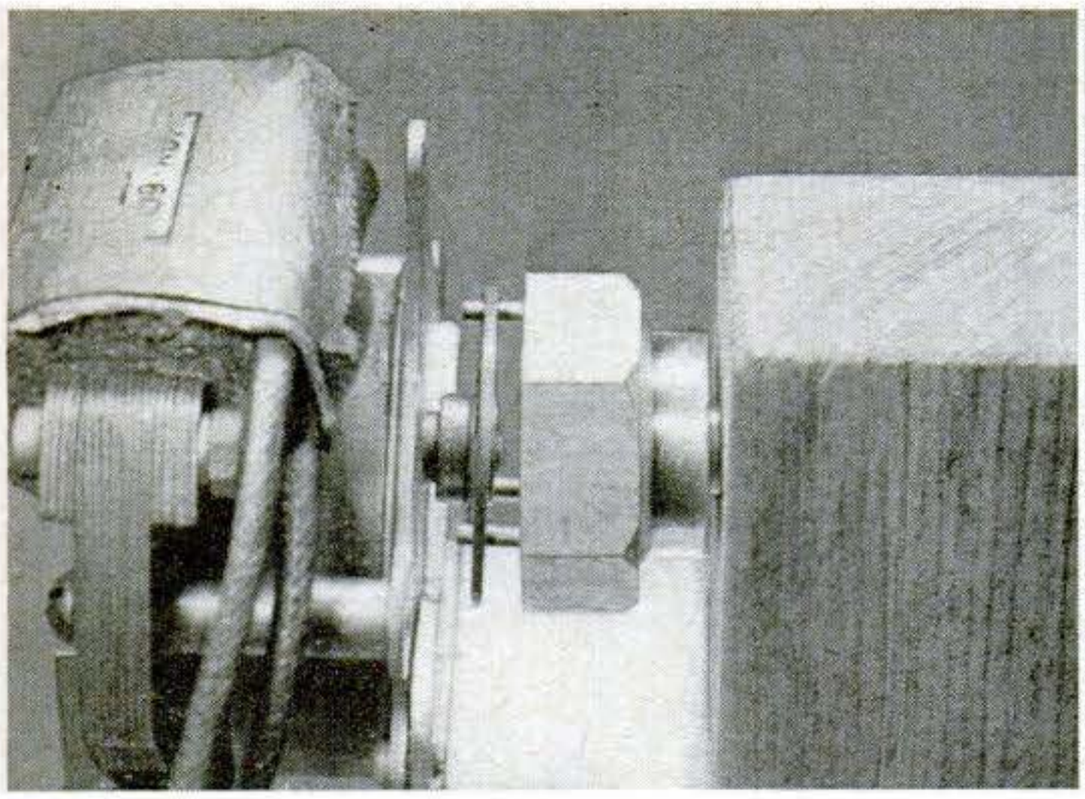
By Walter E. Burton

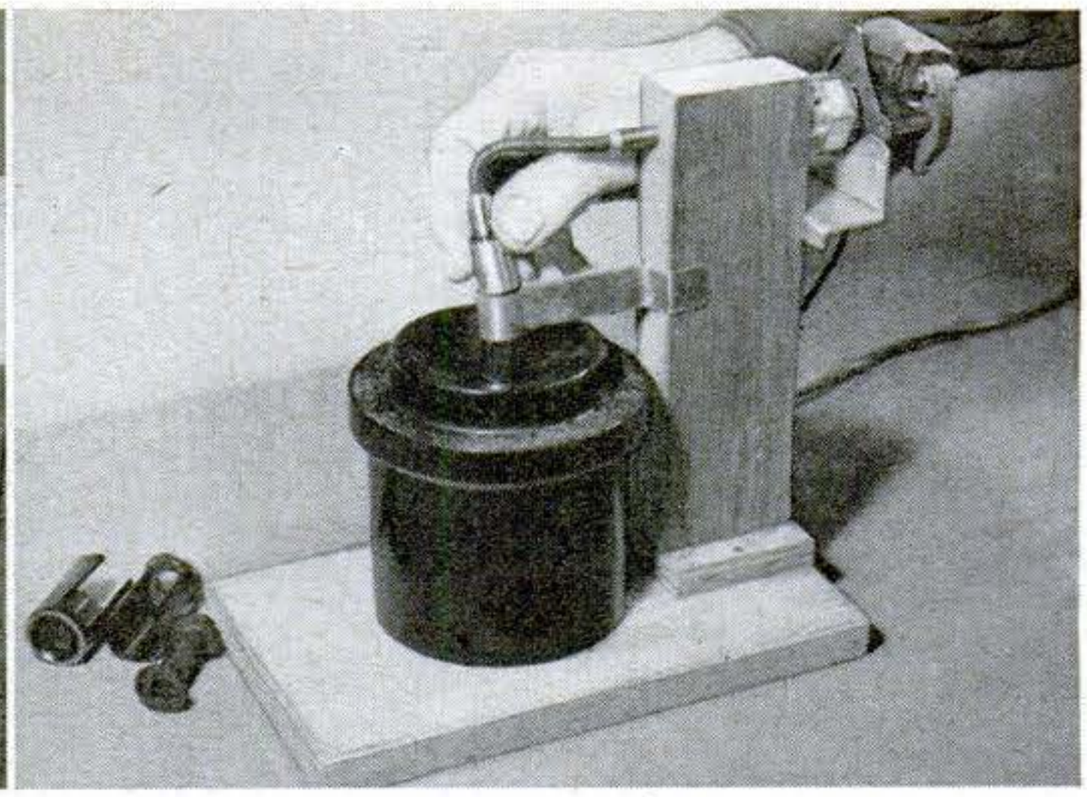
ROTARY power turned its first corner when a cave man twisted two slack vines into a rope. Although he didn't know it, he had come up with a flexible shaft. Since then, inventors have outdone the pretzel industry with torque anglers that range from the meshing hardwood gears of primitive water wheels to the smooth-working universal joints, speedometer cable, and ring gears and pinions in your car. Thrown in for variety are combinations of pins and sleeves that fall all over themselves in zany actions that delight the eye but are seldom put to practical use.

In spite of their variety, almost all power-angling devices belong to one of six types. They are either flexible shafts, slack couplings, pulley-and-belt assemblies, universal joints, gear combinations, or pin-and-sleeve drives.

1 Flexible shafts let you angle power in any and all directions. Simplest form is a short length of hose connecting two unaligned shafts. A light coil spring slipped into the hose prevents the rubber or plastic from collapsing when the union is angled sharply, as in photo above. Commercial flexible shafting is frequently used to drive hand-held tools. A number of spirals of tough steel wire transmit power through a metal sleeve which bends but does not rotate. Good lubrication is important because friction is great.

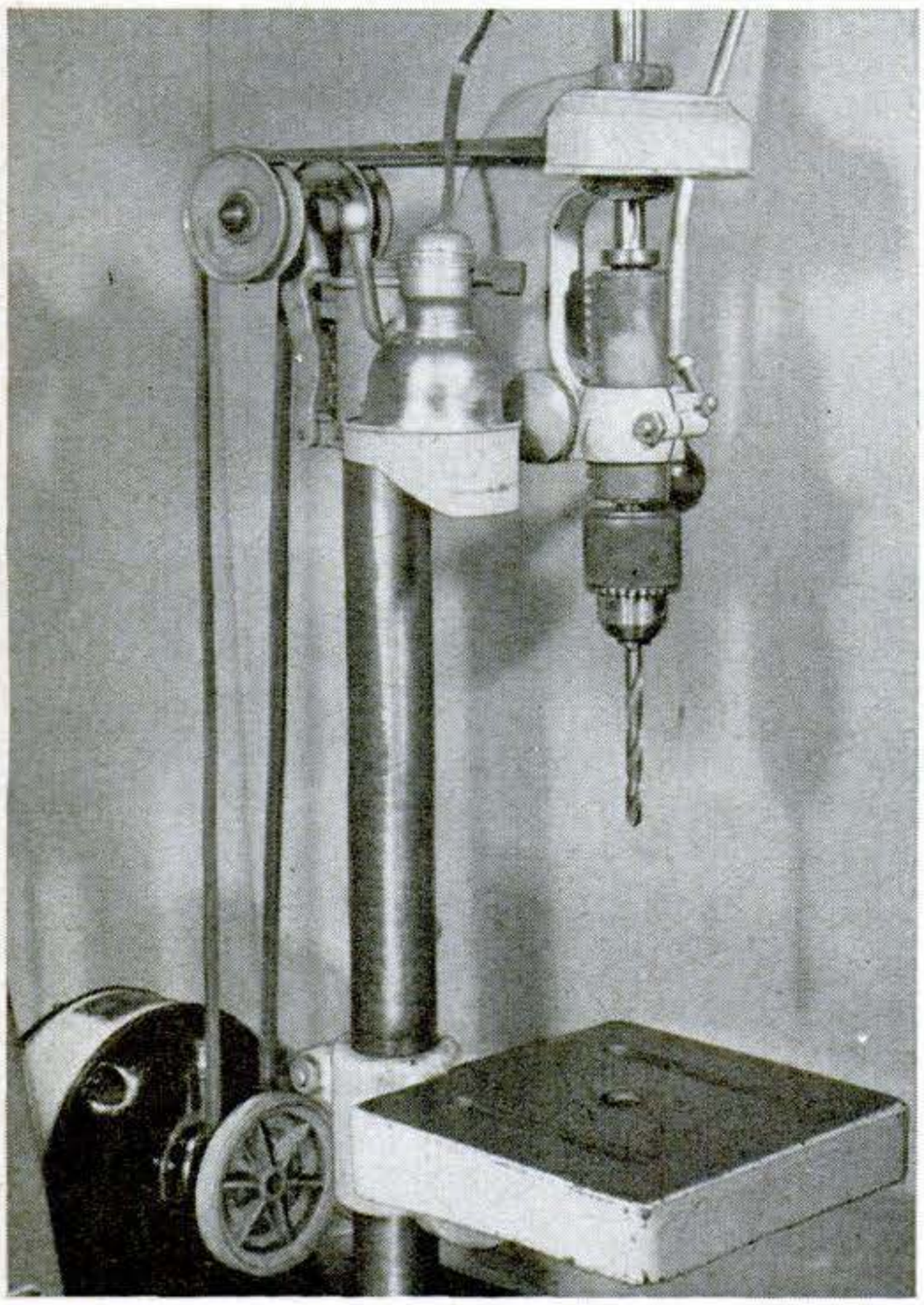
Copyrighted material



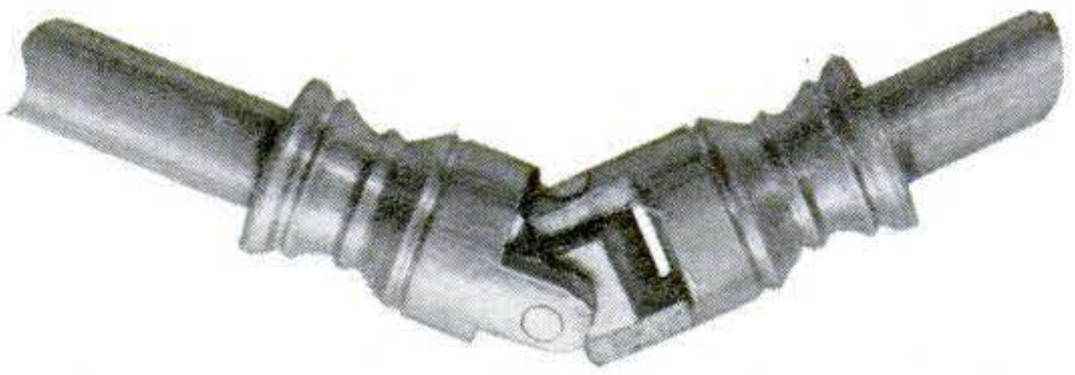


2 Slack couplings will give your motor a positive link with unaligned shafts if the angling between them is small. The coupling above shows how. Pins projecting from the face of one disk pass through holes in another. Wear is great where the power load is heavy, so the pin should be well lubricated.

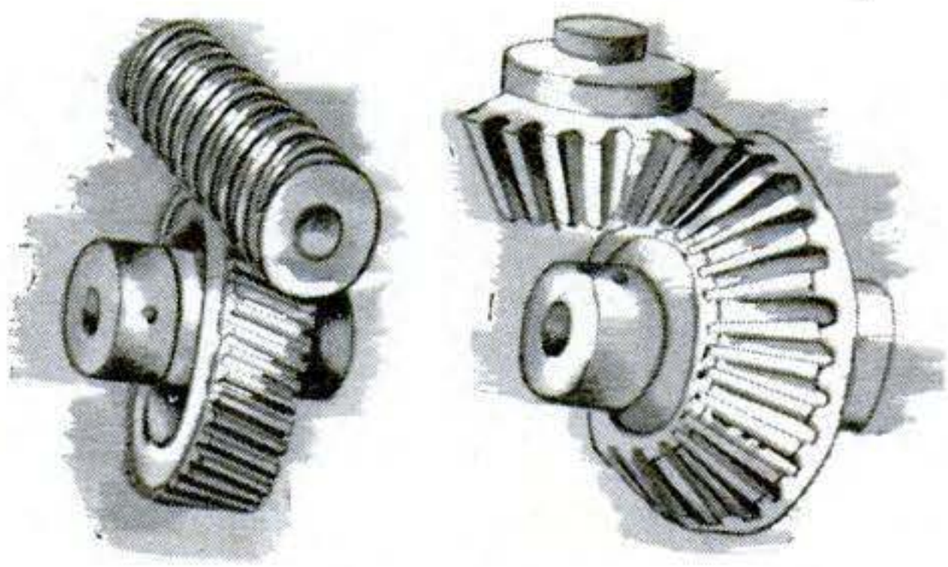
In this application—a combined slack coupling and flexible shaft used to agitate photo solutions—a low-speed motor makes the slack coupling work at its best. And the slight erratic motion, caused by some whip in a well-worn speedometer cable, keeps the chemicals well mixed.



3 Pulleys and belts slapped the power of big stationary engines to hundreds of thousands of factory tools before fractional-horsepower electric motors brought a separate set of mechanical muscles to each job. Where motors are bench-mounted, as in the case of the drill press above, some shop tools still use angled belt-and-pulley drives. The number of angles you can turn with a train of belts is unlimited, although slippage may make the arrangement impractical. You can also use belts to elbow power to hand-held tools by placing pulleys at the junctions of hinged rods. Your dentist's drill is a good example of this.

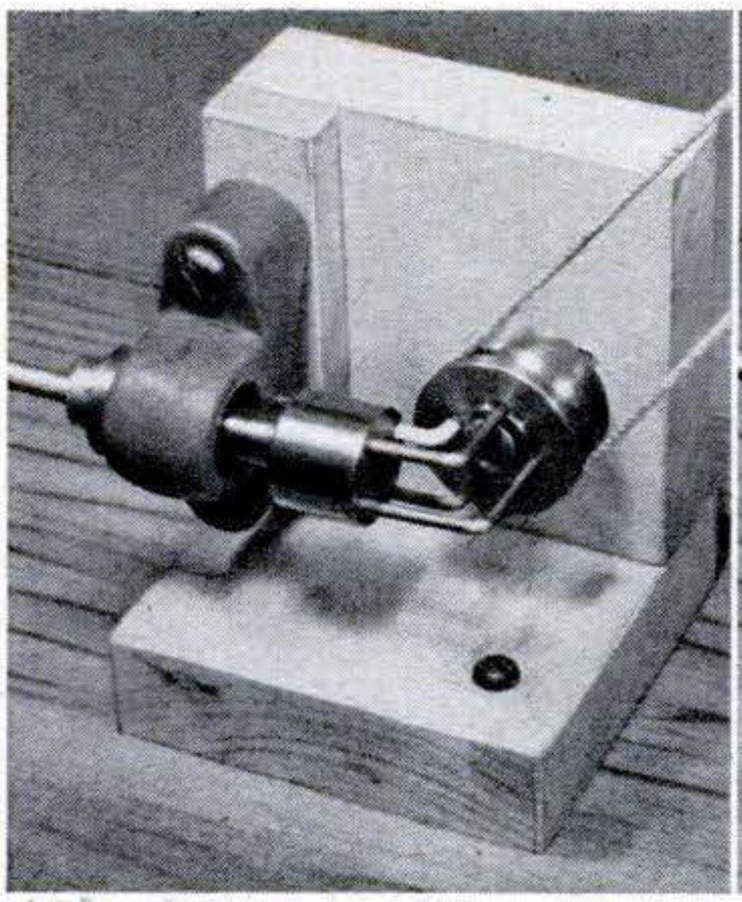


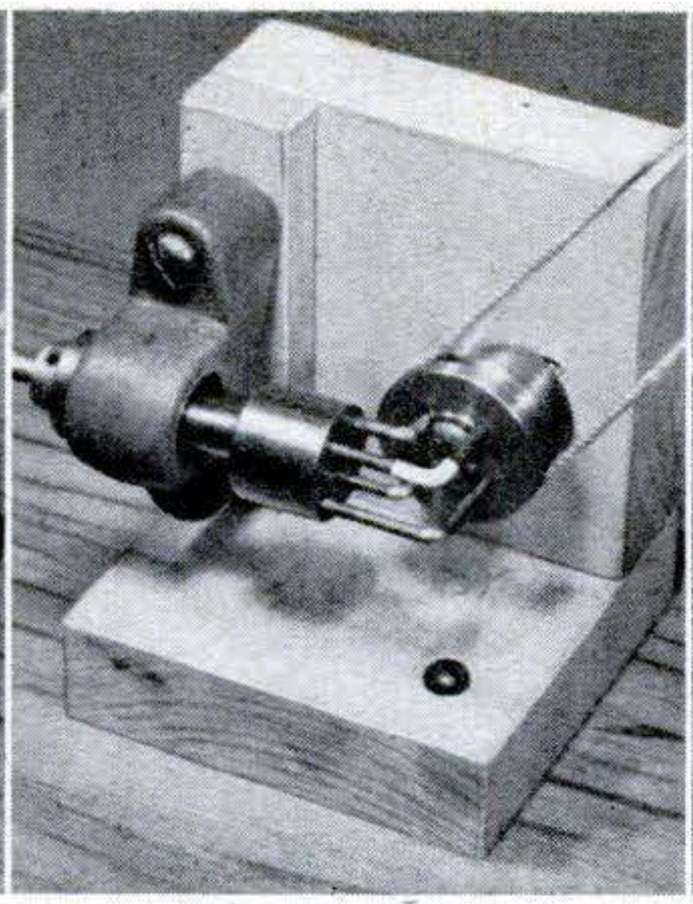
4 Universal joints are husky power benders. Formed of two U-shaped forks placed at right angles, they pivot on pins in a central block or spider. This type of positive link between a motor and driven shaft wears far better than a slack coupling and carries a fairly smooth flow of power around angles of up to 45°, in any and all planes. Needle bearings and other antifriction devices, sometimes combined with grease-retaining boots, help commercial universal joints serve you long and dependably.

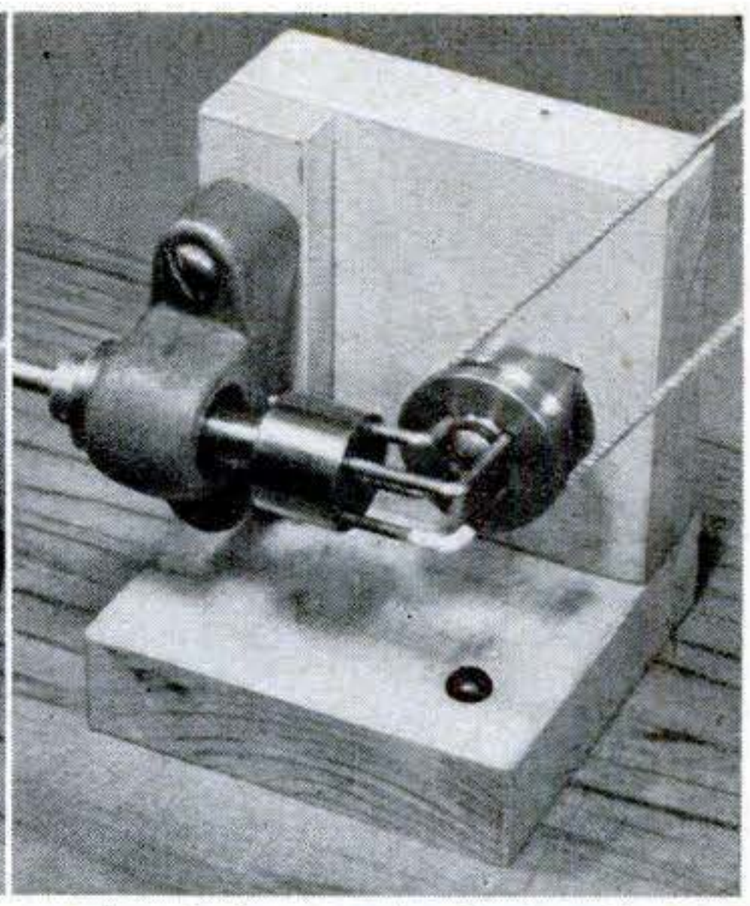


5 Gears solve power-cornering problems for everything from model locomotives to washing machines. The worm-and-gear set above, at left, converts high worm speed to very low driven-gear speed. Bevel gears above, at right, are more versatile, for they can increase, decrease or duplicate motor-shaft speed. A third form of gearing used to angle power is the helical type, in which the teeth are cut at 45° angles across the gear faces. If both helix gears have their teeth inclined in the same direction, they will mesh at right angles.

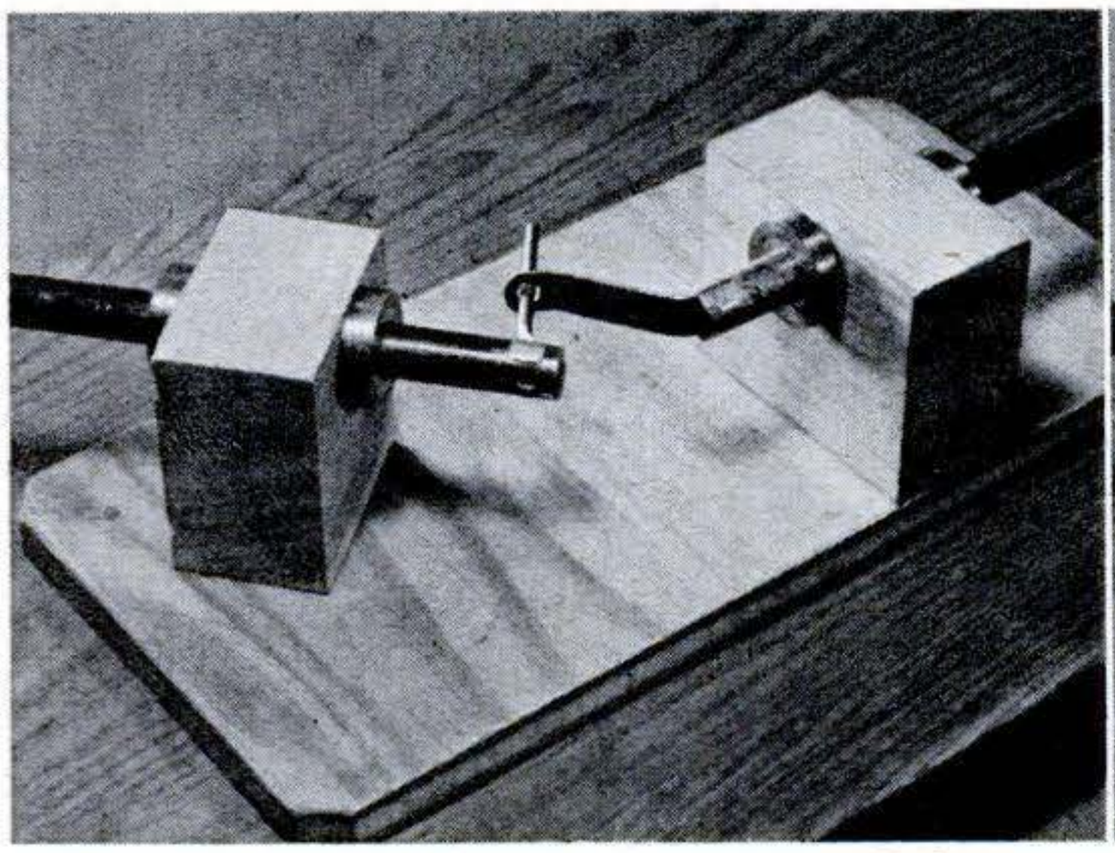
Copyrighted material

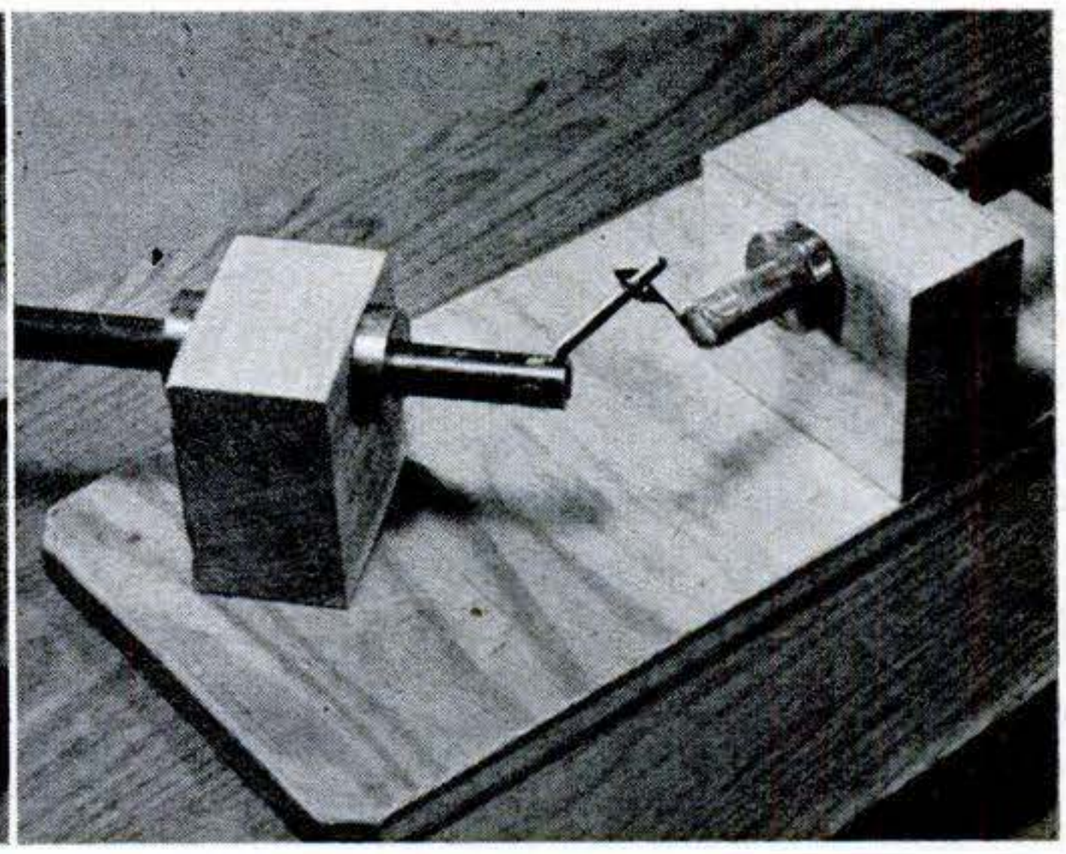


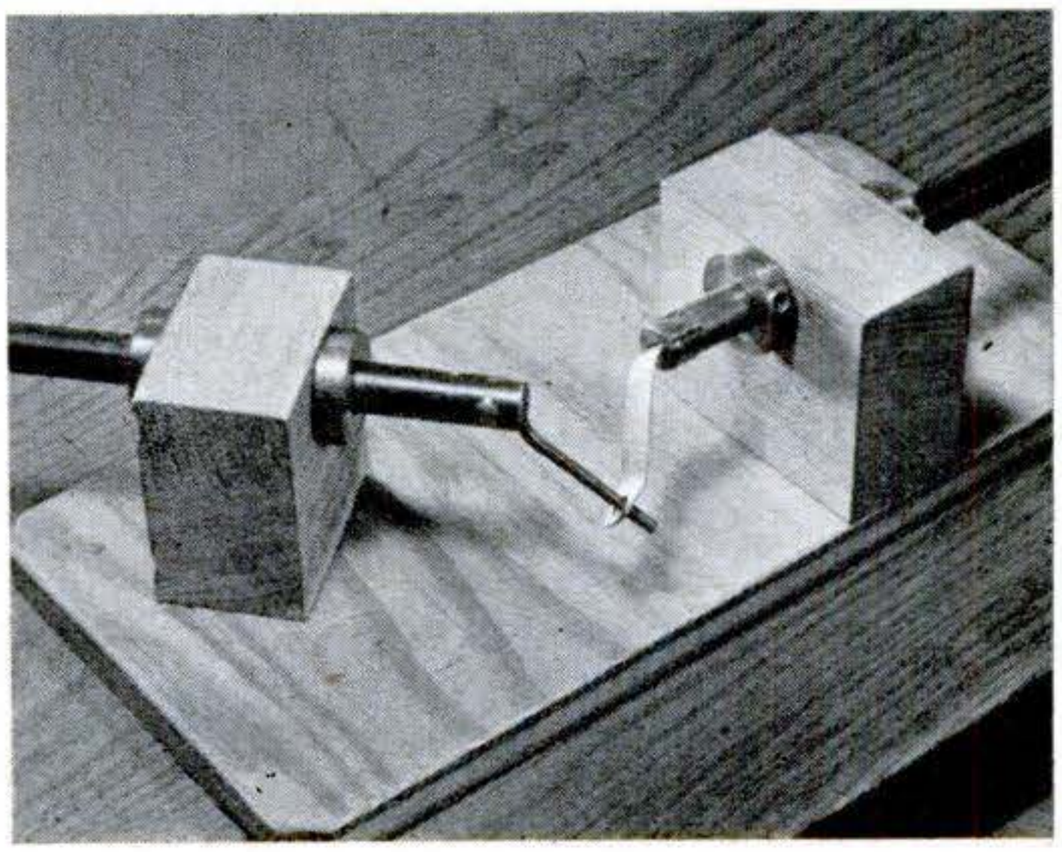




6 Pins and sleeves. These torque turners are ideal for the gizmos in a mad scientist's laboratory. But if you want to convince Junior that the most complicated machine is not necessarily the best, you can do it by building a reasonably accurate facsimile of the model above. To your own amazement it will work very smoothly, dazzling you with a display of busily shuttling arms. But don't try to make it turn the butter churn—its angled pins have an aversion to hard labor. Here's how it operates: A pillow block and bushing are lined up at right angles and a shaft is passed through each. On each shaft end is a thick cylindrical head with four holes bored through it, as shown in the photos. The holes in both heads are the same distance from the centers of the shafts and would mate if the heads were placed face to face. Pins bent to 90° angles connect corresponding holes. When one shaft is rotated, the pins transmit vertical motion to the driven head, while horizontal motion is absorbed by a backward-and-forward movement of the pins in their sleeves. Still puzzled? Then notice that one of the pins in the model has been painted white, to let you trace its shuttling action. By now, Junior is way ahead of you. He's convinced that pins and sleeves don't necessarily *have* to work at right angles. And he is absolutely right!

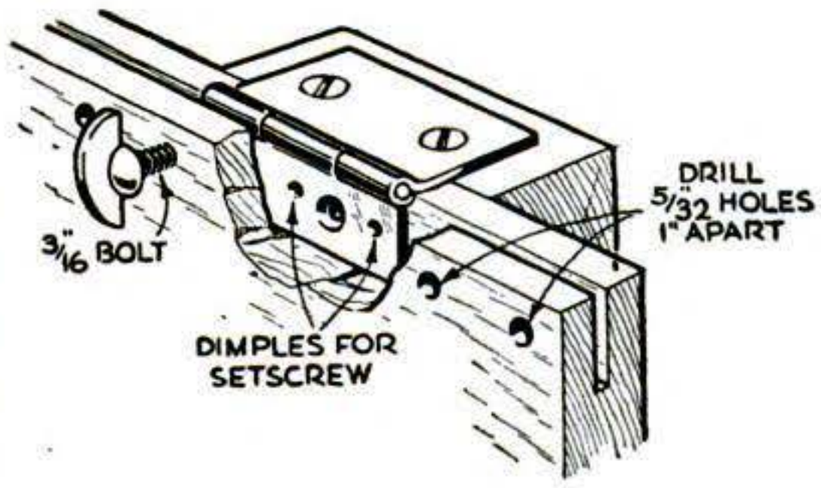


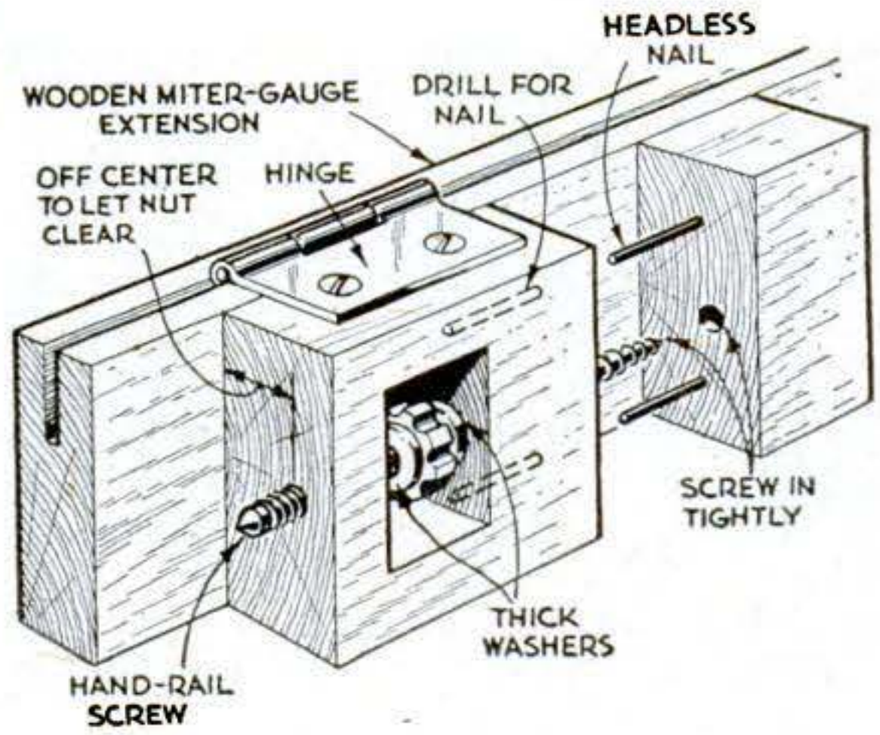




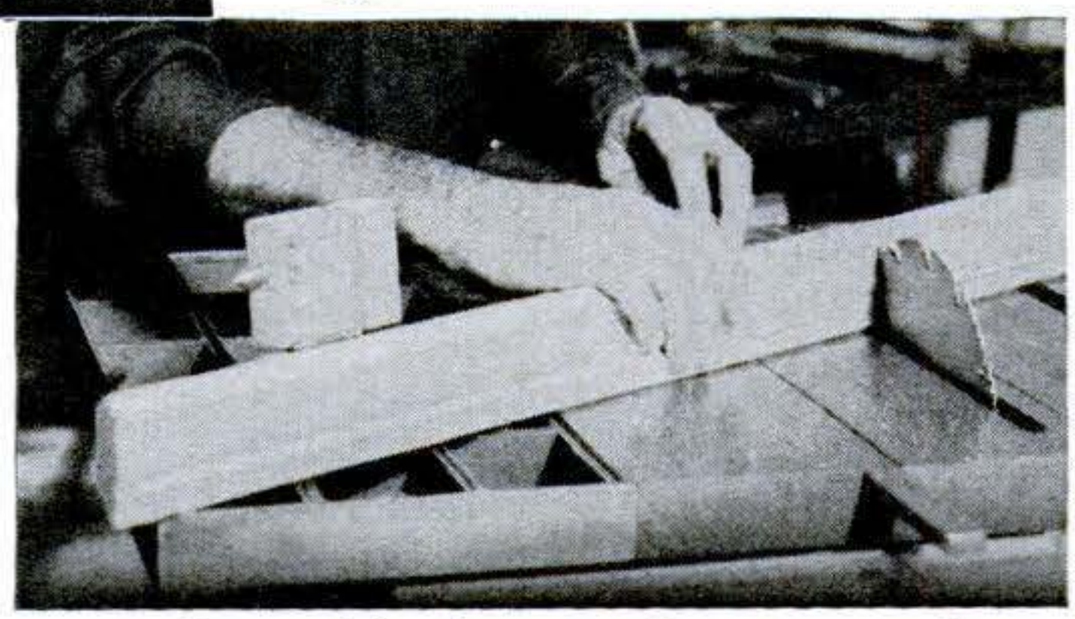
Cross a slack coupling with a pin-and-sleeve drive and you get this hybrid sidewinder. A fixed arm with a hole drilled near its outer end is mounted on one shaft, and a pin is pivoted in a slot at the end of another shaft. The fixed arm is then bent in such a way that the pin will engage the hole without binding when the shafts revolve. Photos taken at intervals show both hinging and sliding actions which keep this angled drive from buckling. The hookup works best when the shaft with the pin does the driving. Unlike the model at the top of the page the sidewinder is so simple in design that it has been widely used in toy manufacture. An outstanding example is the drive used in inexpensive toy motorboats. In some of these, two angled pins make sliding contact, eliminating the pin-and-hole **connection.** **END**

Copyrighted material





IT'S DOWN when you want to use the stop block for sawing to exact length. A thumb nut provides vernier adjustment, while rough setting is made by sliding the entire block assembly along the wooden miter-gauge extension and clamping it with a setscrew.



IT'S UP for making intermediate cuts on long stock, but the stop setting is retained for further use. This is handy in making miter joints, when you must often saw off a reverse angle left on the material, but will need the stop again afterward for cutting to length.

Miter-Gauge Stop Swings Up to Let You Cut Long Stock

THE usual miter-gauge stop or clamped block must be removed to saw a piece that extends past it. But here is a stop you flip up to handle such long pieces. When you drop it back, it is in precisely the same location as before.

To rig such a stop, first saw a kerf along the top edge of the wooden extension to be bolted to the miter gauge, deep enough to receive one leaf of a stout butt hinge. Drill a series of 5/32" holes behind the kerf. Turn a 3/16" bolt into them to cut its own threads. Also drill four dimples in the hinge leaf at such a height that the bolt will seat firmly in any of them.

A plain stop block can be screwed to the free leaf of the hinge. But for vernier adjustment, cut a mortise in the block and drill a ⅜" hole across it as shown. Insert the machine-screw end of a ⅜"-by-4½" handrail screw, with washers on each side of the thumb nut. Screw the pointed end fast into a second smaller block. If necessary, a pair of headless nails can be driven into one block and matching holes drilled in the other to form guides, as shown in the drawing.—*Harry Louden, Sarasota, Fla.*

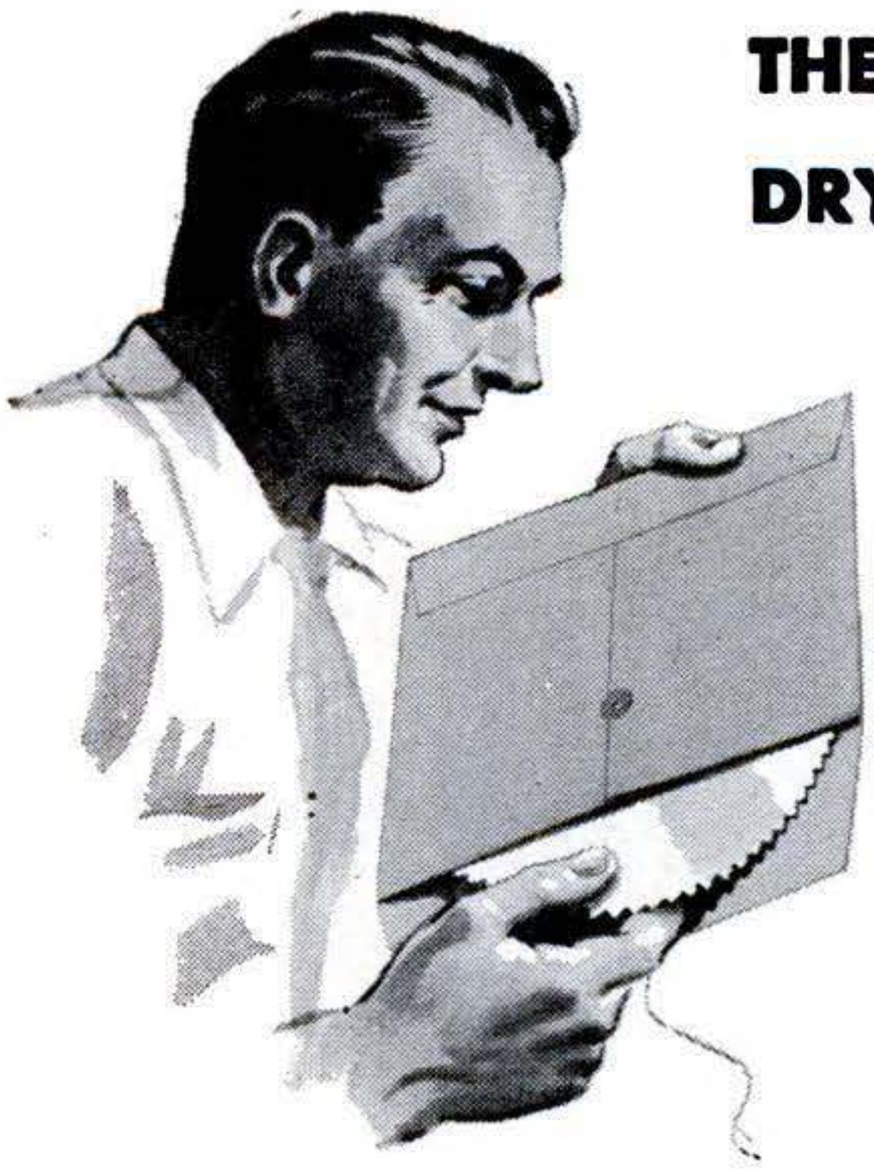
Concrete Mixer Serves as Tumbling Barrel to Clean Rusty Tools

SEVERAL persons in this area used a concrete mixer as a tumbling barrel to clean up large supplies of rusty nuts, bolts, nails and small tools after a recent flood.

It was done by throwing three shovelfuls of sand into the hopper, dropping in the rusty articles and running the mixer for 10 minutes to half an hour, depending on the amount of rust.

Then the mixer contents were dumped on wire screening placed over a barrel and the articles raked back and forth until the sand had sifted through.—*James Schwinn, Manhattan, Kan.*

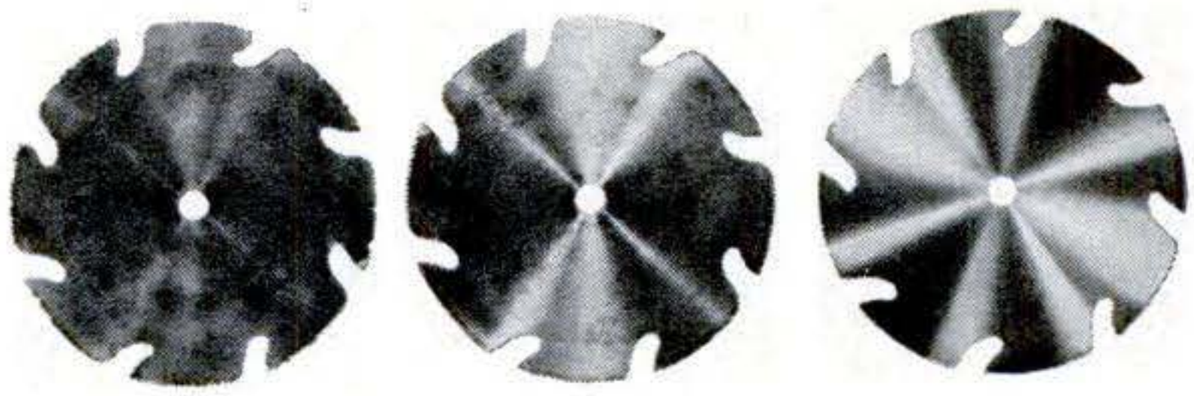
Copyrighted material



THEY CAN'T RUST if you keep them in DRY VAPOR PACKVELOPES® with VPI®

HERE'S positive RUST PROTECTION for

circular saws • chisels • drills • auger bits • pruning shears • planes
steel rules and tapes • compasses • dividers • calipers • hunting knives
marine and fishing gear • hooks and flies • spark plugs • micrometers
auto parts and accessories • files • taps • dies • golf clubs • any steel tools



without protection — with oil protection — with VPI protection

YOU NEED NO OIL, NO GREASE, NO FUSS OR MUSS • Just pack them and forget them.

Send for Berlin & Jones' big no-rust miracle package containing a dozen assorted VPI* envelopes, large size to protect circular saws, others for tools and small parts—plus a big 12 x 36 sheet of VPI* coated Kraft paper, enough to protect an average power tool or to line a large tool chest and drawers. You get the same rust protection used by the U. S Government and leading industries in this no-rust miracle package for only $2. Included free is a handy booklet of practical proven VPI* uses. Money back if not satisfied.

*Vapor Phase Inhibitor

No oil, no grease, no goo, no dirty degreasing job, no clean-up necessary—thanks to this miracle paper which turns destructive moisture into protective VPI vapor . . . giving you years of positive protection from rust.

HUNTERS • PROTECT YOUR GUN FROM RUST
Just slip it into a specially made PACKVELOPE **GUNBOOT** with VPI. Will keep it rustproof for years. No oil, no grease, no cleaning. Only **$2.** Satisfaction guaranteed or money refunded.

If not at your local hardware or sporting goods store WRITE us and we'll see that he gets them or

Berlin & Jones
Established 1843

INDUSTRIAL USERS

Cut costs way down on handling and packing of ferrous materials. Get same rust protection as used by U. S. Government. Write for Technical bulletin on VPI to: Engineering Department, Berlin & Jones, 601 W. 26th St., N. Y. 1, Dept. P.

HARDWARE DEALERS

Every hardware store can sell VPI packages on sight to their trade with our self-service, self-selling kit. Makes money for you without effort. Ask your jobber or write for complete details to Berlin & Jones, 601 W. 26th St., New York 1, N. Y., Dept. P, Wholesale Division.

USE THIS MONEY BACK GUARANTEE COUPON

BERLIN & JONES CO., INC., Dept. PS
601 West 26th Street, New York 1, N. Y.

Send me_____(through my dealer) no-rust miracle package(s) of VPI envelopes and paper at $2 per pkg.

Send me_____VPI Gunboots @ $2 each.

Name_____

Address_____

City_____Zone_____State_____

My dealer's name is_____

Address_____

Enclosed check ☐ money order ☐

Copyrighted material

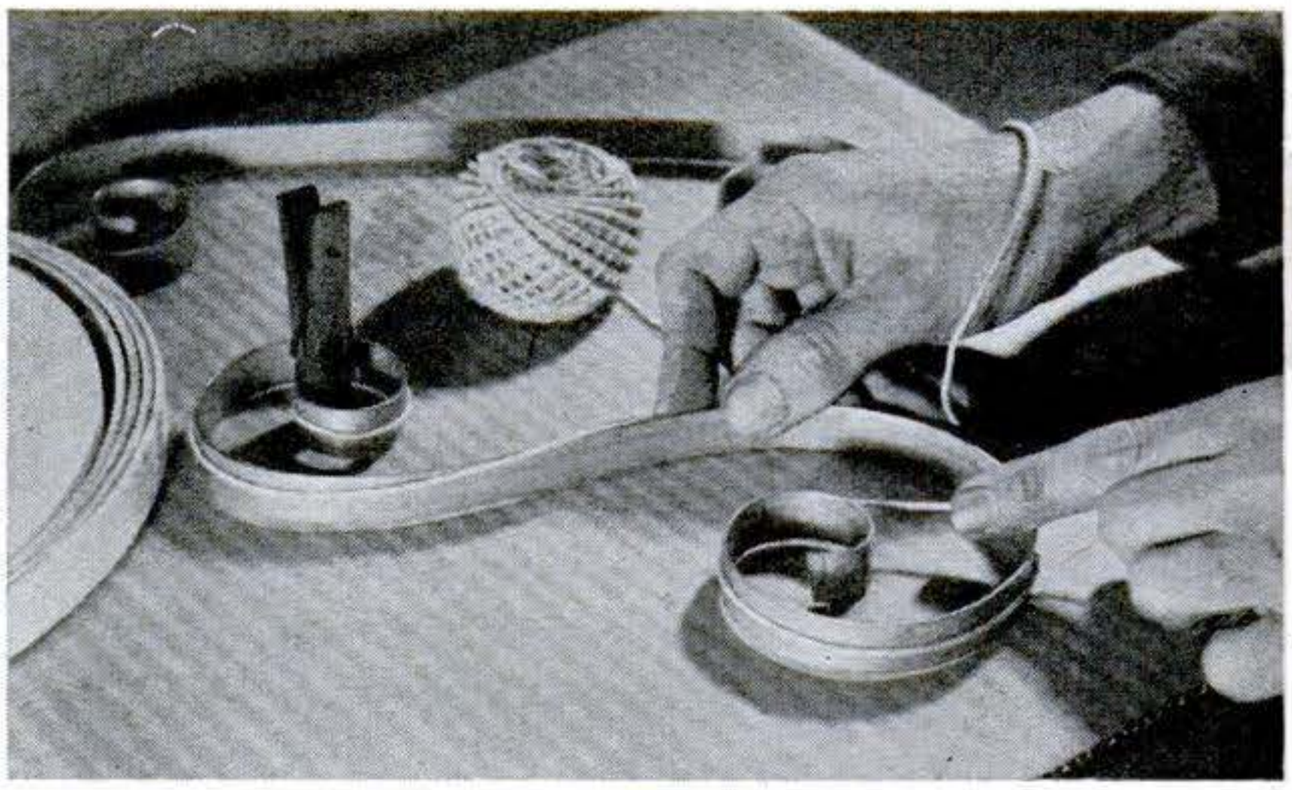
PAINTED BLACK, molded-plastic scrollwork takes on appearance of wrought iron. For wrought-aluminum effect, use aluminum paint; for weathered bronze, a gray-green flecked with copper gilt.

Plastic Ornaments Look Like Metal

"Wrought-iron" scrollwork, just like real, takes only minutes.

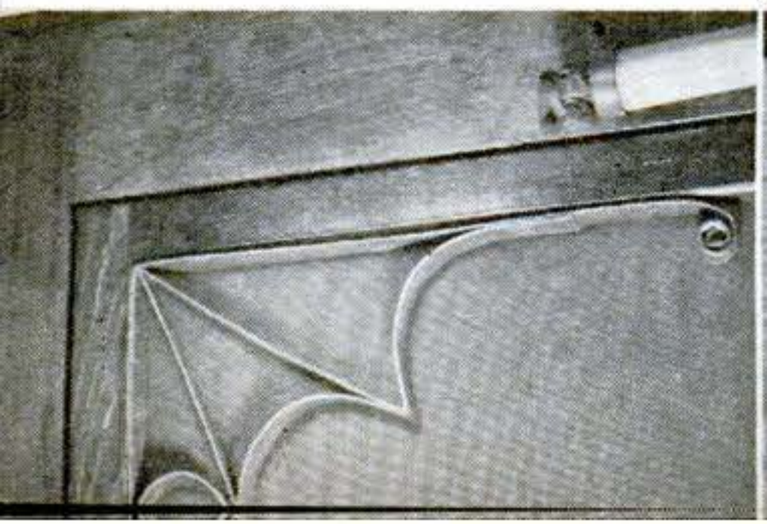
YOU don't have to be a blacksmith to turn out attractive ornaments that have the look of real wrought iron, bronze, aluminum or copper. By using narrow strips of a plastic-impregnated fabric, you can—where strength isn't needed—bend up fancy curlicues and other decorative designs at a fraction of the time, cost and labor of real metalwork.

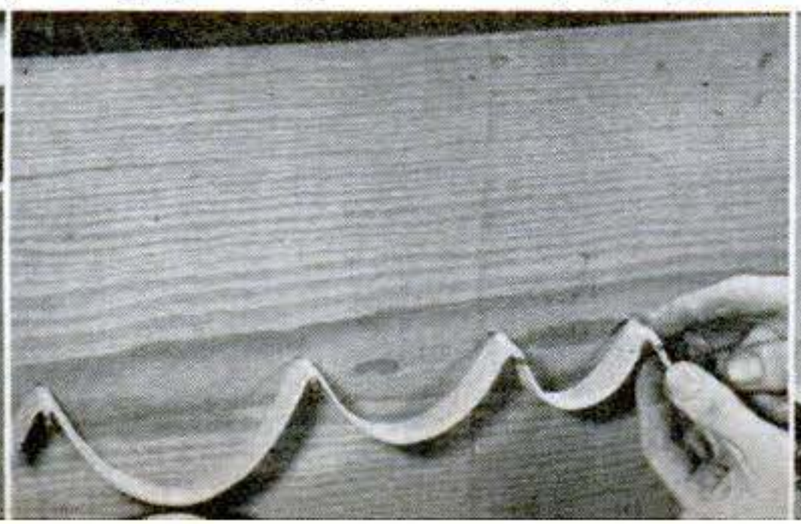
The material is first softened by dipping the strips for a few seconds in a shallow tray of special solvent. Then the strips are wrapped around metal forms that you can either make yourself or buy from the manufacturer. Among the dealers that sell the plastic (Celastic) and solvent is Ben Walters, Inc., 156 Seventh Ave., NYC.—*Walter E. Burton, Akron, Ohio.*

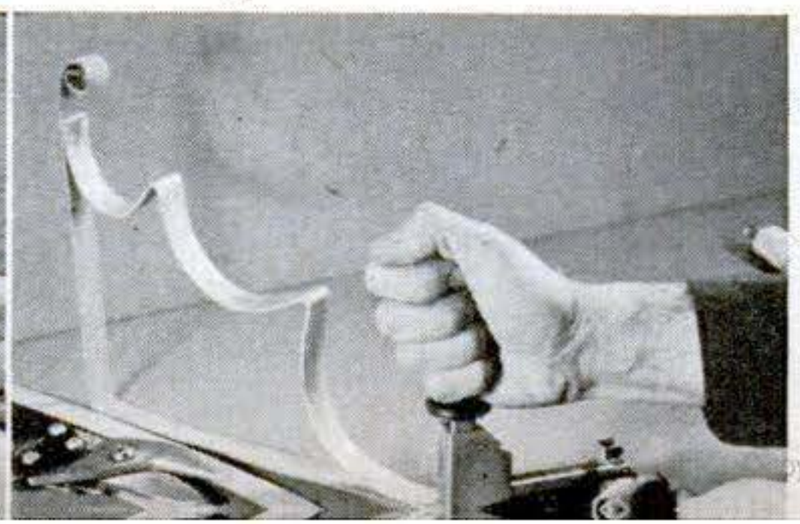


TO FIND LENGTH OF STRIP NEEDED, wind string around metal form, held by spring-type clothespin at one end, and transfer measurement to plastic. Then wrap plastic around form, remove form, set strip aside to dry.

CORNER BRACKETS add inexpensive decorative touch to a screen door (left, below). To make a series of curves, simply drape the softened strips over row of nails (center) and let dry. To fasten the strips to each other (right), use small staples or cellulose cement.







Copyrighted material

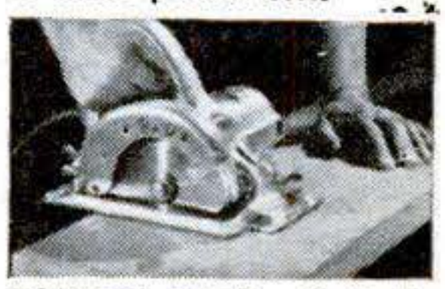
Look what you can do with this New Black & Decker Saw!

$64.50 B&D Utility 6" Heavy-Duty Adjustable Saw COMPLETE WITH BLADE

Fully adjustable for every depth and angle cut from 2" at 90° to 1⅝" at 45°.

Powerful B&D-built motors take the tough spots without overheating or slowing.

New lever arm permits safe retraction of lower guard to make pocket cuts.



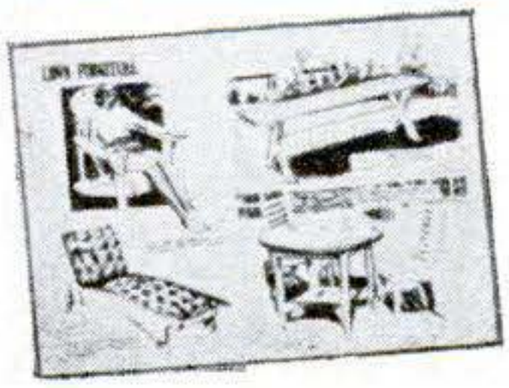
B&D saw-grip handle is always at natural sawing angle. Rugged, king-size shoe gives better balance.

Try it yourself and get a chance to win $1,000.00

Get a demonstration of this wonderful new saw at your Utility dealer. Then fill out a free entry blank, describing the features you like best—and you may win $1000 in Black & Decker's big Saw Contest!

Bob Davis says: Send 25c for my "Handy Tips" booklet, full of home repair ideas plus information on patterns for projects like sample below.* (No stamps, please).

*T. M. Reg. Easi-Bild Pattern Company



For address of your nearest dealer see "TOOLS - ELECTRIC" in the Yellow Pages of your telephone book.

Need more living space? Do-it-yourself materials let you convert your attic or basement at far less cost than you ever dreamed! And the new Black & Decker Heavy-Duty 6" Adjustable Saw takes the back-breaking work out of the job!

This new saw makes angle cuts, bevel cuts—every cut you need to add a beautiful room to your home, or make bookcases, cabinets, etc. You can get information on plans and patterns by mailing the coupon below, and your dealer will advise you on materials. When you visit him, ask to try the new Adjustable 6" Saw—as well as the larger 7-, 8- and 9-inch Heavy-Duty Utility Saws!

Black & Decker

UTILITY® PORTABLE ELECTRIC TOOLS

Bob Davis, Home Service Dept. H6S, The Black & Decker Mfg. Co., Towson 4, Md.
Please send me "Handy Tips for Handy Men." I am enclosing 25c.

Name .....

Address .....

City ..... Zone ..... State .....

Copyrighted material

Rolling Your Own Screens

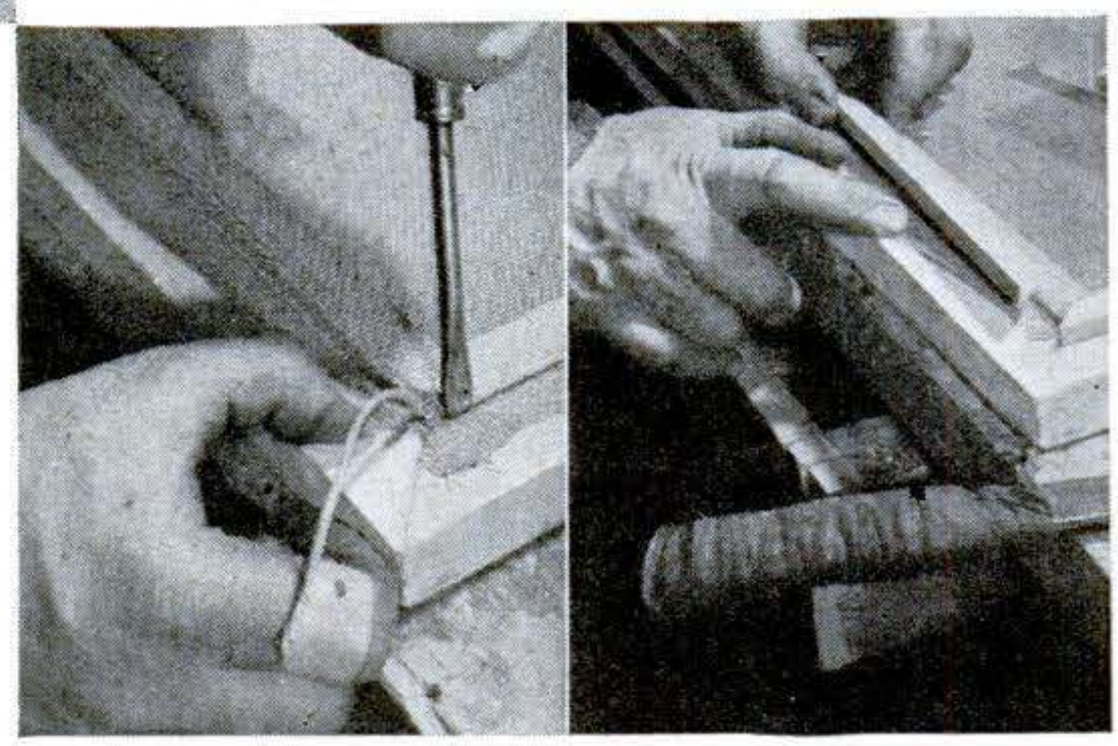
This tackless groove-and-roller method does a quick smooth job.

HERE is a speedy way to make good window screens. The mesh is smoothly and tightly stretched, and there are no tacks to put in one at a time or rust out later.

Miter the frames, using the same width of stock all around. Then run a ⅜"-deep saw kerf in one face along the inside edges of all four pieces. Assemble with glue and nails or corrugated fasteners so that the groove is continuous all around.

Make the roller by turning or grinding a deep flange on a short piece of round stock, or by mounting a big washer as in the drawing. Thickness is critical; the roller should be a loose fit in the kerf to leave room for the screening to be forced in on both sides. Round off the roller edges; they should not be sharp.—*J. M. Finn, Pittstown, N. J.*

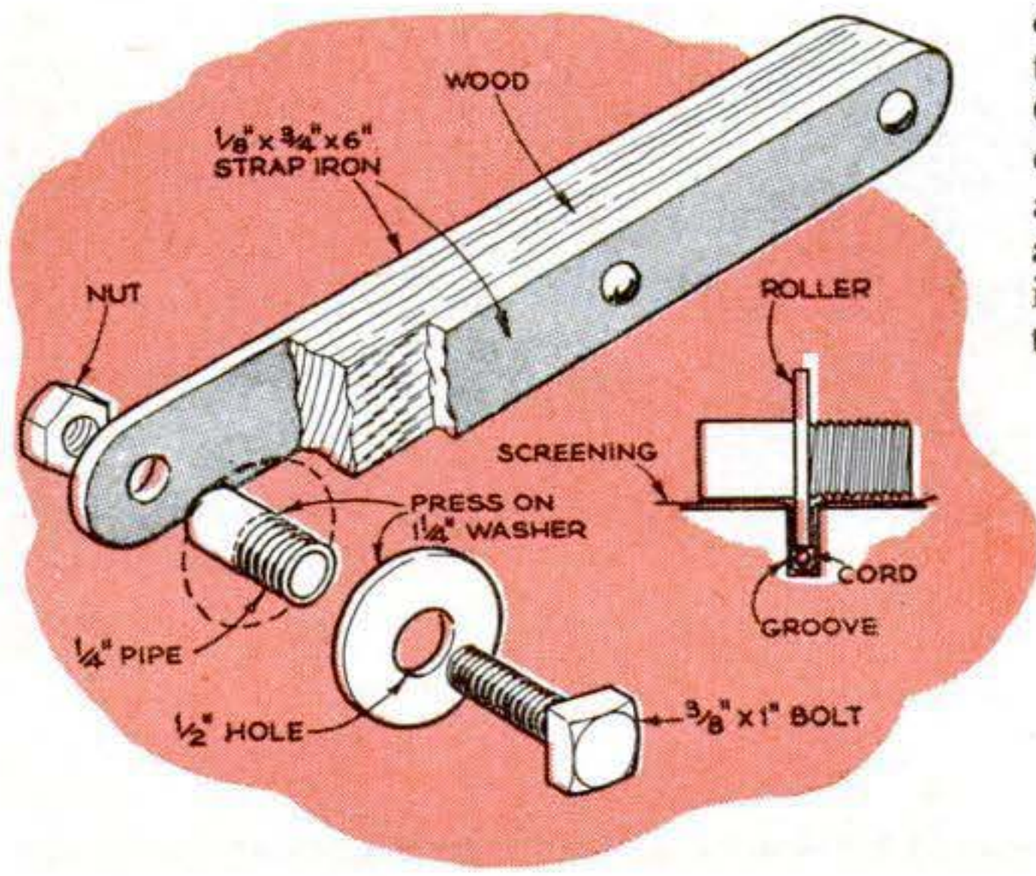
CUT THE SCREENING to outside frame dimensions. Aluminum or copper mesh works best; galvanized screening is brittle and more prone to tear. Starting at one corner, roll the material part way into the groove. Then lay strong twine over it and roll hard, forcing both twine and screening deep into the groove.



ROLL OPPOSITE SIDE next to pull screening evenly across the frame. Twine keeps the mesh from being cut by the roller. Do the other two sides. Cut screening from outer corners to groove at 45° as above. Use a screwdriver to push it and the twine in at the extreme corners.

COVER THE GROOVES and screening with half-round or flat molding, mitering the corners the same way you did the frames. Nail with brads. Then run a sharp knife along the outside of it to cut off excess screening. Paint the frames and add hangers.

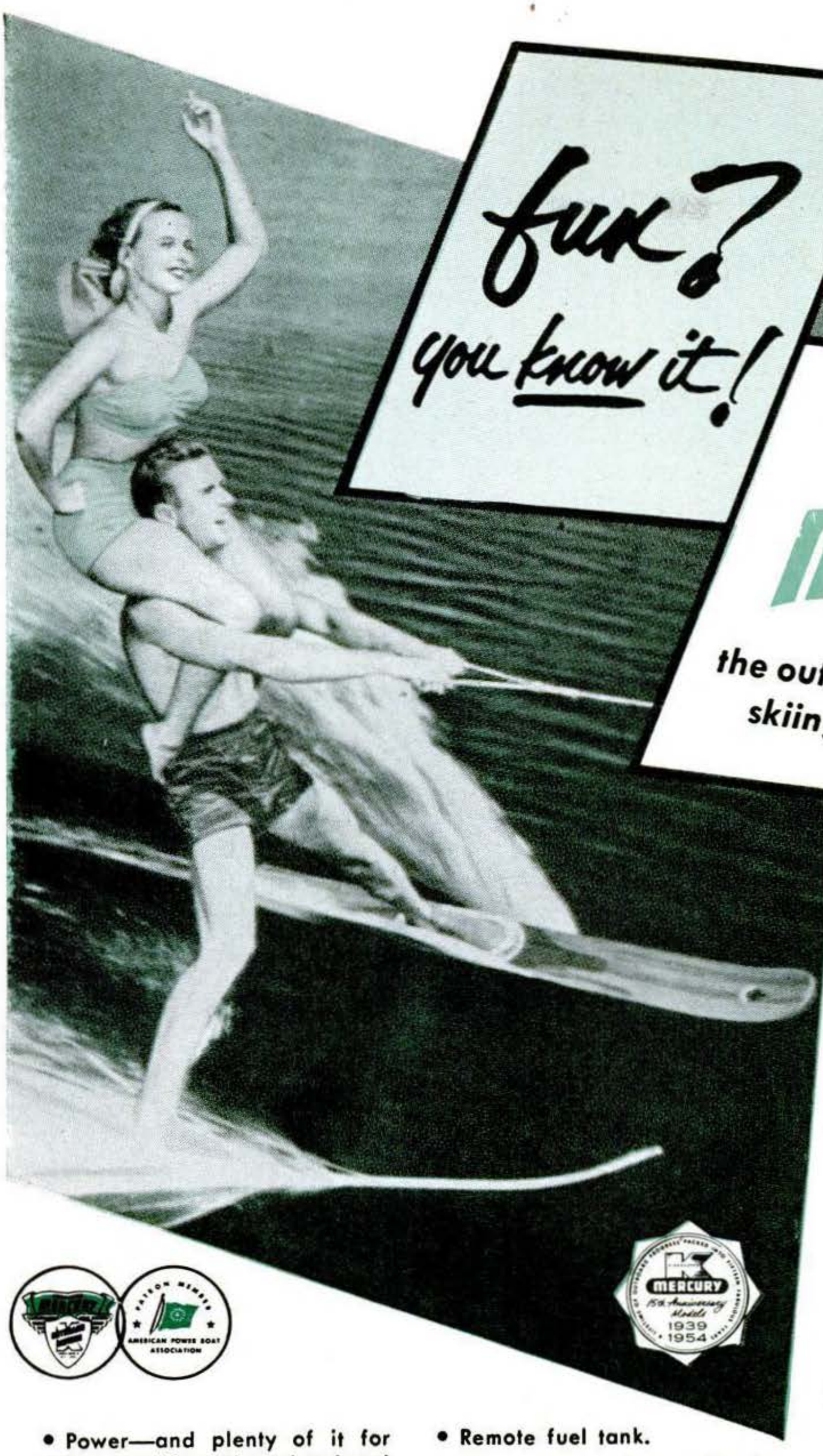
TRY SEVERAL WASHERS in the kerf made by your circular saw to find one that is a loose fit (if yours is a very narrow blade, it may be well to change or reset it). Cut a ¾" length off a ¼" pipe nipple and file down the threads until you can drive on the washer tightly. Be careful to keep it square. File the shank of a bolt until the pipe turns on it freely. Mount in a strap-iron-and-wood handle as shown.



Typing Ribbon Changed Quickly

CHANGING a typewriter ribbon is quicker and cleaner if you fasten the end of the old ribbon to the new one with cellulose tape. Pulling the old ribbon through the guide will thread the new one in behind it.—*Henry Josephs, Gardenville, Pa.*

Copyrighted material



fun? you know it!

When the POWER'S by KIEKHAEFER MERCURY

the outboard that made water skiing everybody's sport!

40 h.p. MARK 50

Today's Most Powerful Outboard! Forward, Neutral and Reverse!

- Power—and plenty of it for skiing, for big outboard cruisers!
- Easiest starting of any large outboard because of exclusive 4 cylinder in line construction.
- Integrated remote control design arranged for inside or outside steering.
- Sealed under-cowl—protection against spray, following seas.
- New Cowl-Around carrying handle.
- Compact, modern styling.
- Remote fuel tank.
- Famous Thunderbolt engine for super-smooth power flow . . . overlapping torque.
- New "Hi-Thrust" lower unit, geared for power efficiency with heavy loads.
- "Full Jeweled Power" — Ball and roller bearings throughout.
- Optional: Exclusive 12 volt electrical system — starter and generator to power lights and accessories.

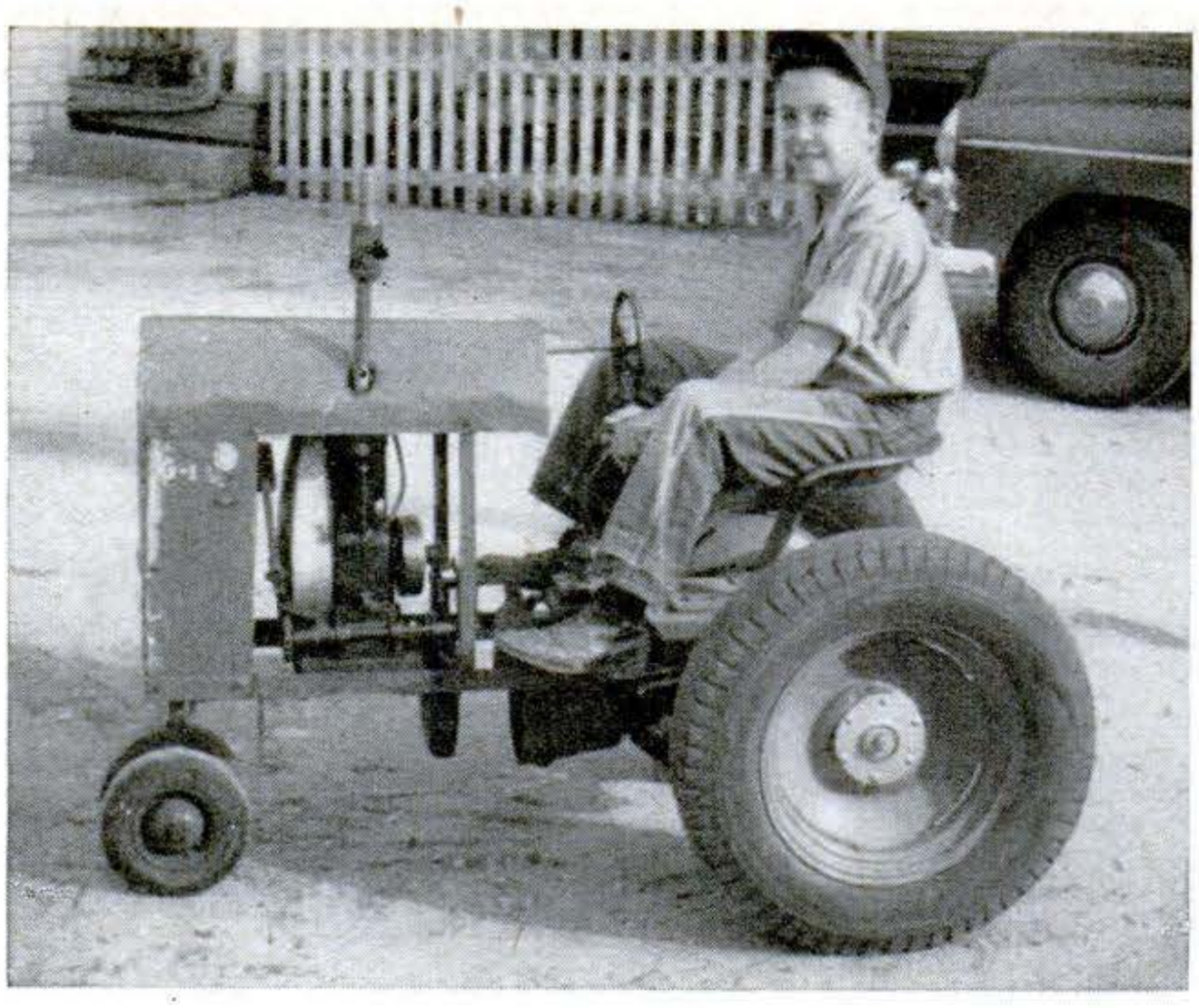
Features of Mercury Motors are protected by issued or pending patents.

See your dealer for a demonstration, and Mercury will be your choice, too! Take your pick of two great Mercury models for water skiing . . . and ask for FREE Mercury booklet, "How to Water Ski With An Outboard"!

© 1954 KIEKHAEFER CORP., Fond du Lac, Wis.

Copyrighted material

CRAFTSMEN AT WORK

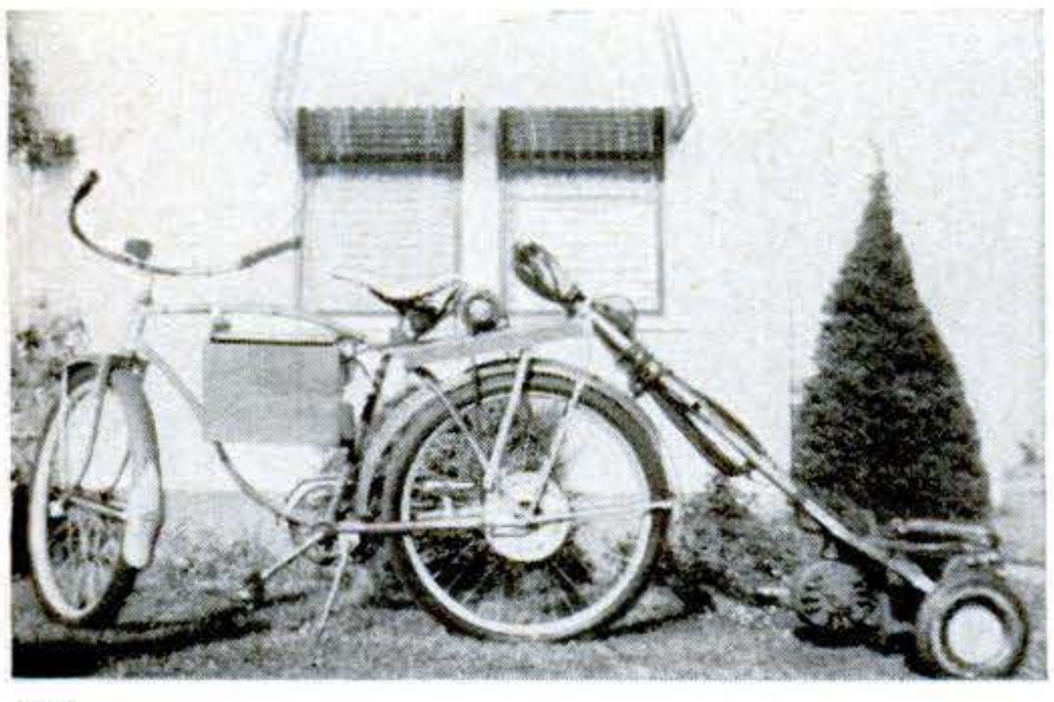


Tractor, built by Thomas Giese and his dad of Montello, Wis., can tow a car with ease. Power from a 1½-hp. Briggs & Stratton engine goes through a three-speed transmission salvaged from an Overland, into a Model T rear end. Total cost of parts was $47.50. Nice touch is exhaust sticking up through sheet-metal hood just like on big jobs.

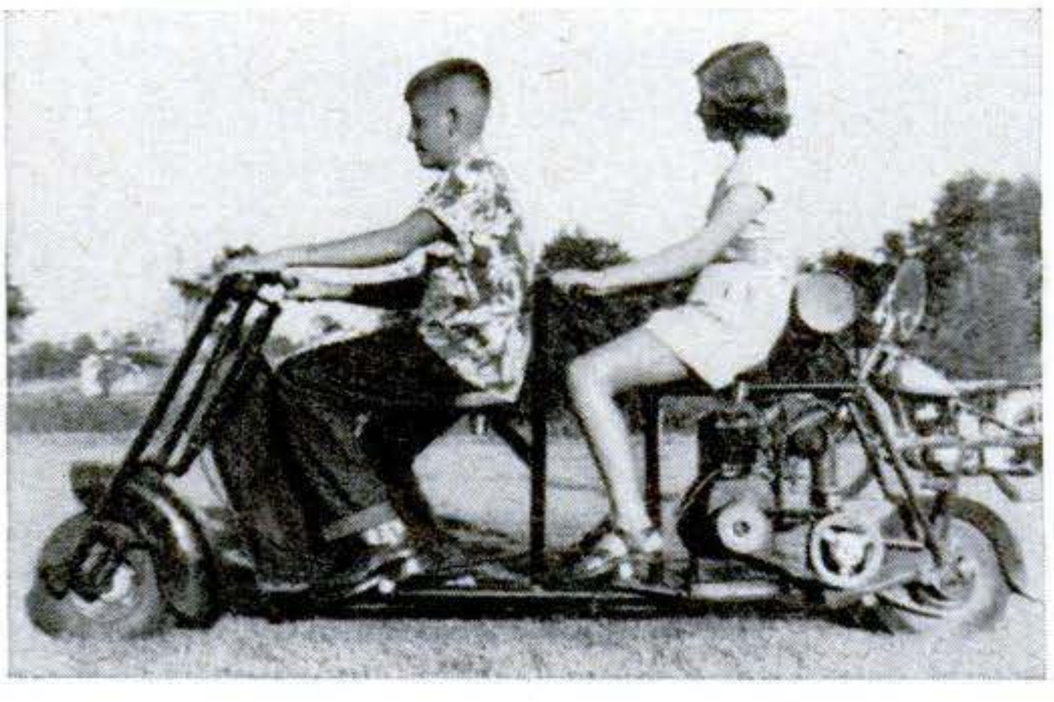
Plow Puller. Capable of turning up a 6″ furrow in second gear, this machine has a 1½-hp. Continental engine with a built-in 6-to-1 reduction gear. Power is carried by a chain on 1-to-1 sprockets to a 1931 Chevrolet transmission at the rear. On the output side, twin 3″ pulleys and V belts drive 9″ pulleys on separate countershafts.

Each belt has its own idler, so that the wheels can be controlled separately. A chain from a 7-tooth sprocket on each countershaft drives a 28-tooth sprocket on each wheel. Top speed is 4½ m.p.h. The machine was built by Walter Heath of Neptune, N. J.

Electricity Pedals this bike at a good clip. L. W. Rives of Woodward, Okla., installed the power unit so his son Bob could haul an electric lawn mower between jobs. The frame was altered to make room for an auto battery, and a salvaged car starter was mounted over the rear fender. Power is carried by a belt to pulley on rear wheel. Bike goes four to six miles on a charge.



Motor Scooter Built for Two. This tandem scooter, powered by a 6-hp. Wisconsin engine, has only one speed forward, yet it climbs hills with two adults and tops 30 m.p.h. on level ground. A Mercury centrifugal clutch gives smooth starts without shifting. Two controls, throttle and front-wheel brake, are on the handle bars. August Dobert of Nashville, Tenn., built it.



Copyrighted material

Bright Ideas For VACATION PROJECTS

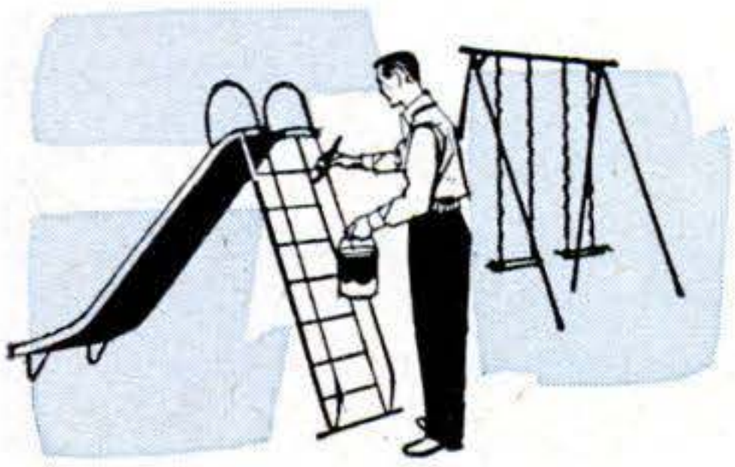
"Liquid Aluminum"

Spray or Brush it on Like Ordinary Paint . . . Give Bright Protection to Your Home, Equipment, Do-It-Yourself Jobs!

Weather protection for rustable gutters, downspouts, flashing, with a bright coating of moisture-resistant *Liquid Aluminum!*

"Light up" your driveway edging by night and beautify it by day with this sparkling wonder-coating of *Liquid Aluminum.*

Vacation's the time to get going on those outdoor improvement and maintenance projects. Imagine a coating that gives you the bright beauty and supreme protectiveness of *real aluminum* . . . yet goes on just like ordinary paint. Check over all your outdoor items that need *Liquid Aluminum* to resist rust and hide discoloration. Made by leading paint manufacturers. Keep a can on hand always.



Backyard gym for the youngsters is protected against rust and weathering *for years longer* with the bright beauty of a *real aluminum* coating.

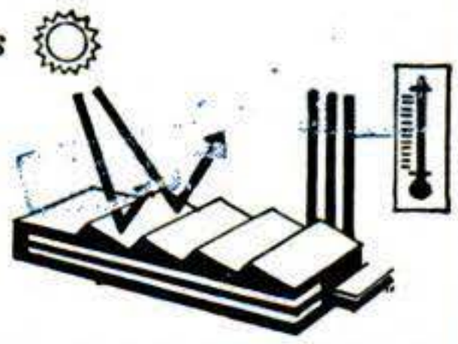
Garden implements look like new again when painted with *Liquid Aluminum.* Brighten up rakes, lawnmowers, outdoor furniture, too.

Amazing Leafing Action

Protective beauty that *lasts years longer* is due to this unique "Leafing" action. Tiny flakes of aluminum rise to the surface as *Liquid Aluminum* dries to form a firm, tight coating of real aluminum.

For "All-Purpose" Type, look for shining foil label at left.

FOR ROOFS, *use heat-reflecting Liquid Aluminum with asphalt. Look for the special Warranty Seal that guarantees the right amount of aluminum in an approved vehicle.*



This advertisement appears in the interest of the Paint Industry of America

REYNOLDS METALS COMPANY • 2500 SOUTH THIRD STREET • LOUISVILLE 1, KENTUCKY

Copyrighted material

[Continued from page 162]

oil back in. He started the motor, eyes on the pressure gauge. It climbed to 20 pounds on the cooled oil.

"Well," the old man inquired anxiously. "Did that fix it?"

"We'll let her warm up," Gus told him. "We can't tell when it's cool."

Oil Pressure Still Falls

Gus could feel the woman's eyes on his face as he sat there, running the motor, watching the oil-gauge needle go down. Slowly it fell, until on the idle it again laid almost against the pin. Gus hated to look in the direction of the woman.

"No," he said honestly. "That didn't fix it."

He was twice a fool, he told himself. He should have looked over the oil-pressure check valve first. It might be gummed up or have something holding it open. He knew one once that had a chip of wood under it. Sweat beaded Gus's weathered features as he raised the hood and removed the spring and ball check from the side of the block, washed them in gas, and blew out the seat with the air hose. He replaced the check valve and again started the motor. The oil pressure remained the same. Hodge looked at the gauge and his face seemed to sag, to grow more wrinkled and tired.

"Well," he said, "thanks for trying, mister. We'll be on our way."

Gus backed to the bench, leaning on it, wiping his hands, fumbling his pipe out of his pocket.

"I'm not through yet," he remarked quietly.

Gus Goes in for More Tools

Stan Hicks jumped into the heavy silence, moving briskly forward to begin sweeping dust from the front floor mat with a whisk broom. The woman coughed thinly.

"Sure is dusty these days, isn't it?" Stan remarked brightly.

Gus straightened from the bench and moved into the stock room. He came out with four long, thin pipes in his hands, selected tools from his kit, ducked under the hood, his burly shoulders blocking all view of what he was doing. A few minutes later he straightened up and wiped his hands on a piece of waste. Then he reached in to turn the ignition switch and depress the starter. He remained there a few moments, revving up the motor and letting it idle. Then he turned and his smile crinkled the crow's-feet at his eyes.

"I reckon, Mr. Hodge," he said, "that you can be on your way now—west."

The old man stepped forward quickly, his eyes holding disbelief, seeing the oil-pressure-gauge indicator standing at 20 pounds at the idle.

"I declare," he said. "You've gone and fixed it."

"Some mechanics," Gus told him, "forget that main and rod bearings aren't the only bearings in the oil-pressure line. This car has gone over 80,000 miles. You're losing your oil pressure through badly worn camshaft bearings. This car will take you now."

Gus Sets a Price

Hodge fumbled in his pocket and drew out a worn purse.

"How much do I owe you?"

"The oil pump," Gus told him, "isn't any better than the one you had when you drove in—you're welcome to the one I put in. I'll charge you four dollars for four camshaft oil regulators. I don't use them often, but I do keep them on hand for emergencies like this, when the oil flow to the camshaft has to be metered down to hold up pressure. When you get to Colorado and get the money, you'd better have new camshaft bearings installed."

"I told you, Sam," the woman said, and her thin face lit up with renewed faith. END

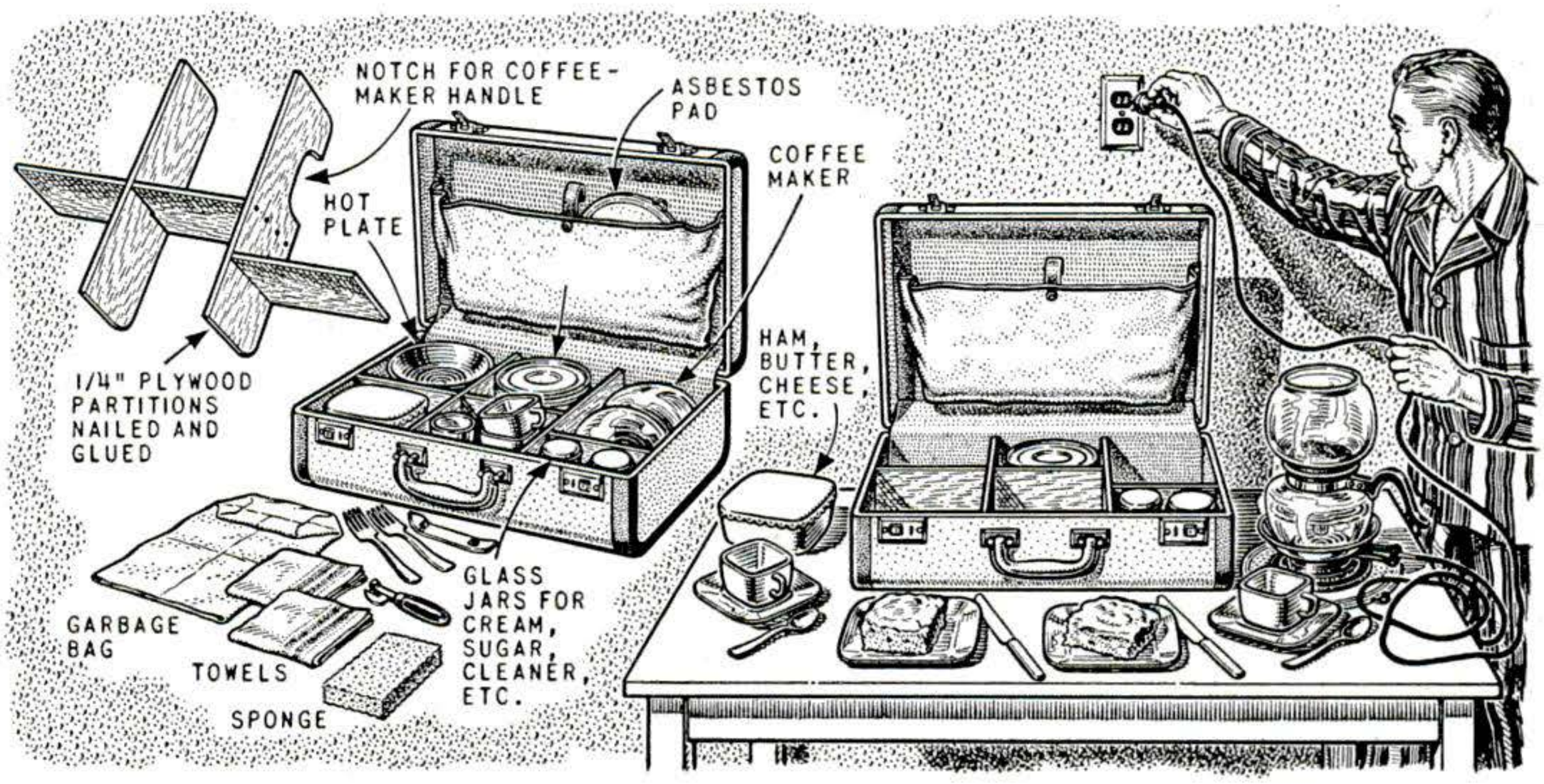
NEXT MONTH: Gus meets an invasion.

Copyrighted material

Hints FROM THE MODEL GARAGE

Bugs on your windshield can be washed off easily with an 8″ square of tent-weight canvas soaked in water. The canvas is rougher than a cloth and does not slide over the dried-hard spots. When clean, dry the windshield with a paper towel or a cloth.

If your car has no turn signals, you can make your hand signals more visible at night by attaching strips of reflecting tape to a special driving glove that you keep in the glove compartment. Strips can be put on both sides of the glove.



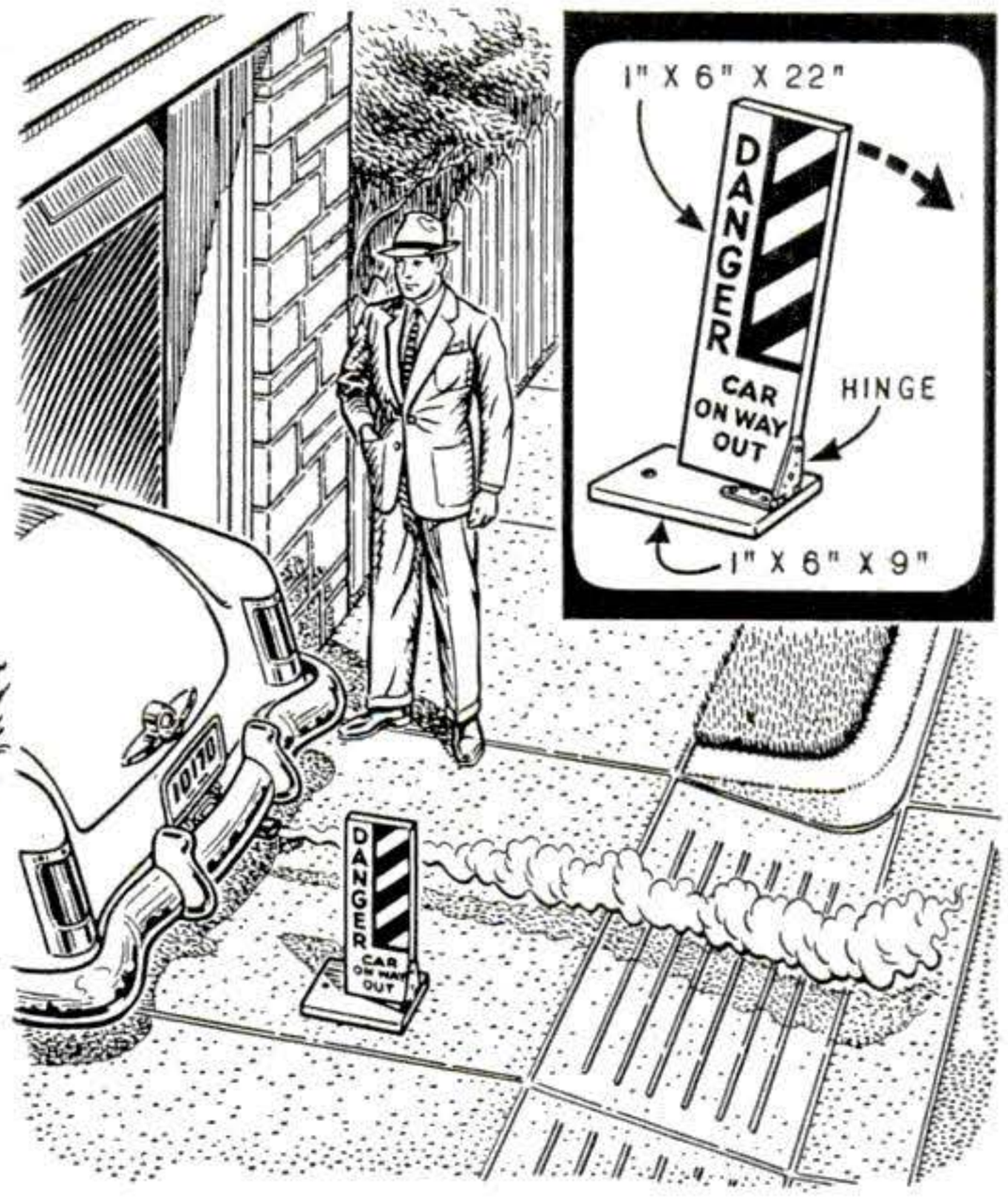
Whip up a meal anywhere with this fitted food kit. Many overnight road stops are nowhere near a diner, but there's a good chance you'll find electricity and water. Everything else you'll need is in the kit. Divide a 12″-by-18″ suitcase, about 6″ deep, into compartments with plywood partitions to hold a coffee maker, hot plate, can of coffee, square plastic cups, bowls and dishes, jars of sugar, powdered cream, and detergent for cleaning up. Ham, eggs, butter and other perishables should be replenished daily.

Please turn the page for more auto hints.

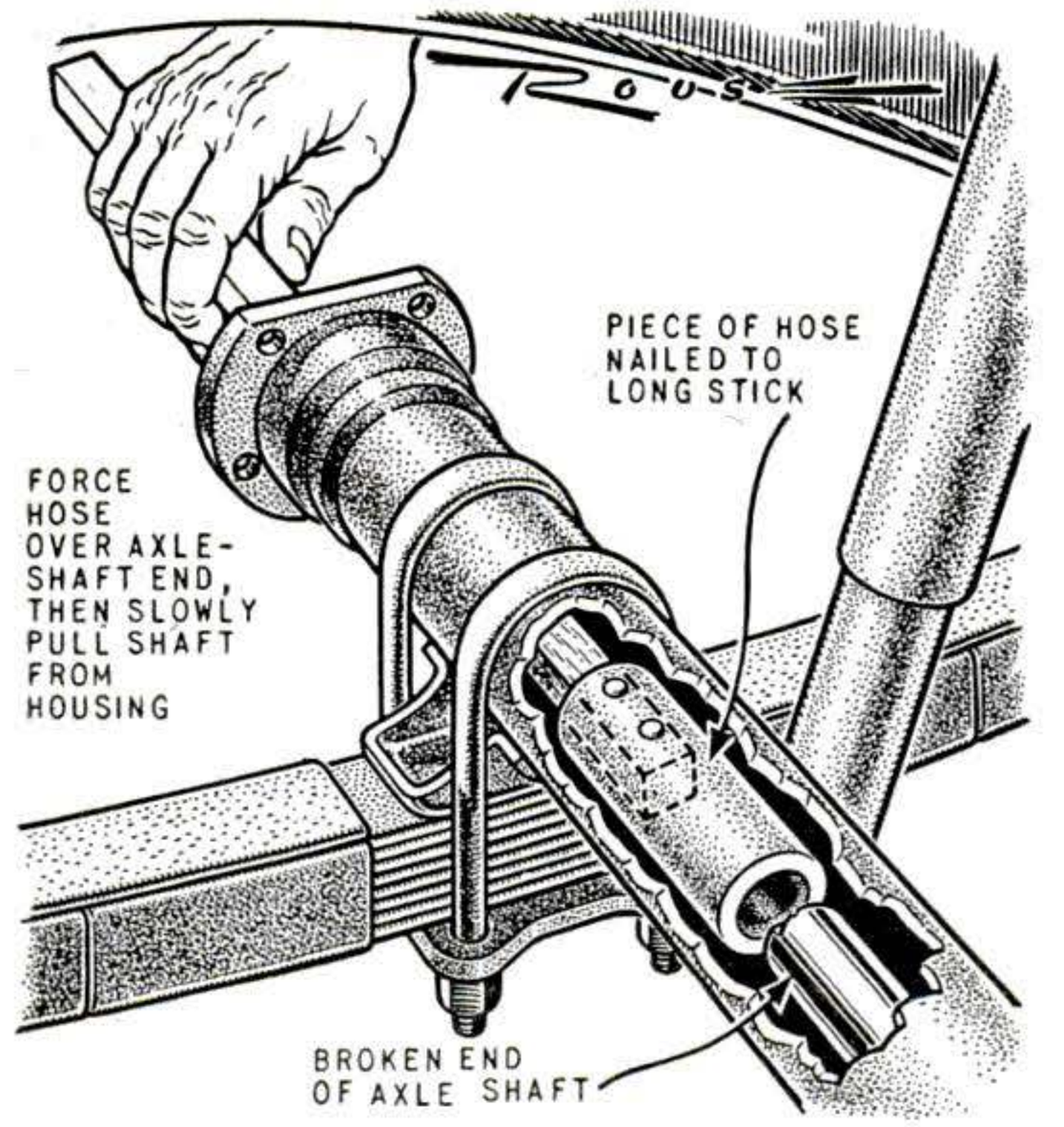
Copyrighted material

MORE Hints from the Model Garage

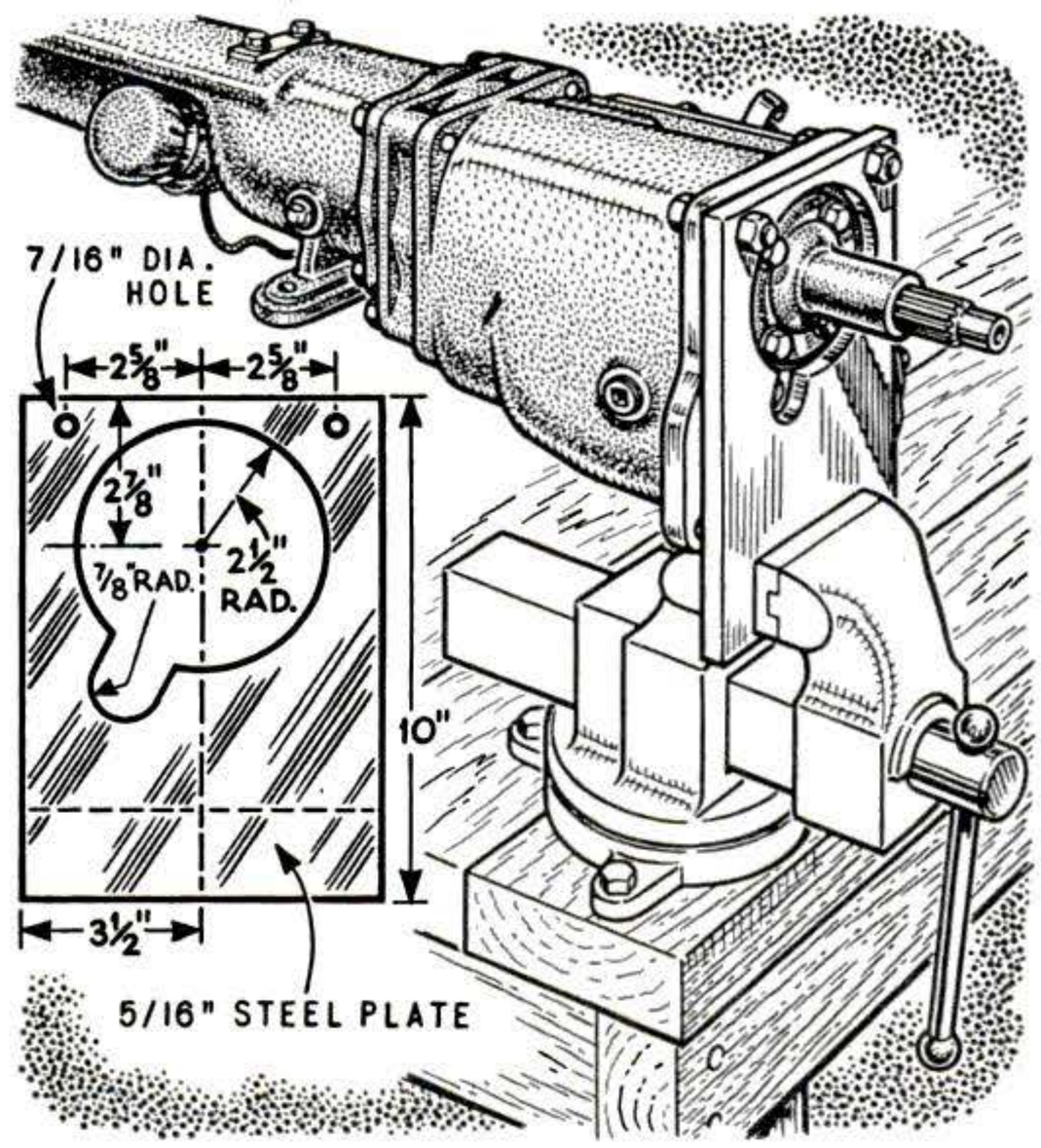
In dusty driving, it helps to close all windows and open the cowl or heater vents wide. This raises the air pressure inside the car. If the windows are partly open, pressure is reduced and dust is sucked through the seams and body openings.



A danger signal like this will warn pedestrians if you must back out of your garage across a sidewalk. Set it upright on the walk, then back over it, knocking it down on its hinged base. Hang the sign on a nail inside the garage when you close the doors.



Tack a short piece of radiator hose to a stick to fish out the remaining stub of a broken axle shaft. Try different sizes of hose on the broken end of the piece that came out of the housing to find a diameter that will fit snug enough to do the job.



Support a '49-'54 Ford transmission for easy overhaul by bolting it to a heavy steel plate clamped in a bench vise. The large opening gives access to the bolts holding the main-shaft bearing retainer and the small opening permits removal of the countershaft.

Copyrighted material

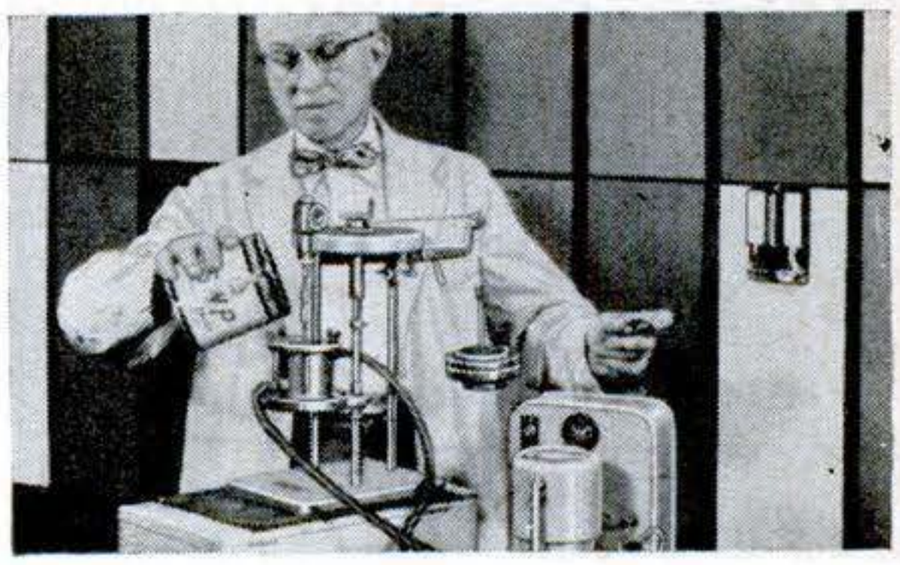
SWP HOUSE PAINT

Lasts Longer... Saves Money

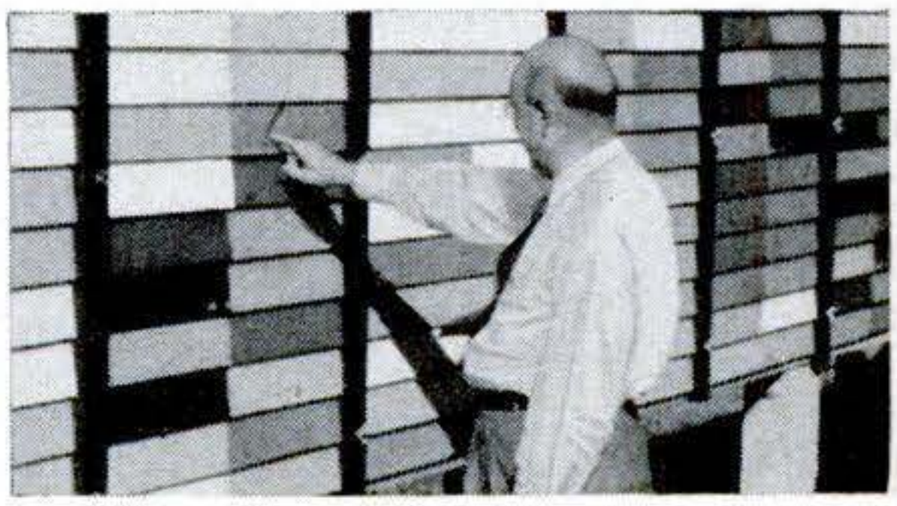
It pays to be "choosy" when you select the *brand* of house paint to be used on your home. Whether you employ a painting contractor or not, the price difference between world-famous SWP® House Paint and house paint of ordinary quality will mean less than $5.00 for the average-size, complete house job. This slight difference in cost pays for years of extra wear and is one of the wisest economies you can make.

In 1953, Sherwin-Williams SWP House Paint was used to paint more homes in America than any other brand. Why? Continuous research in Sherwin-Williams Testing Laboratories and in the field has insured constant improvement and the top-quality performance of SWP. You'll be money ahead when you discover there *is* a difference in house paints!

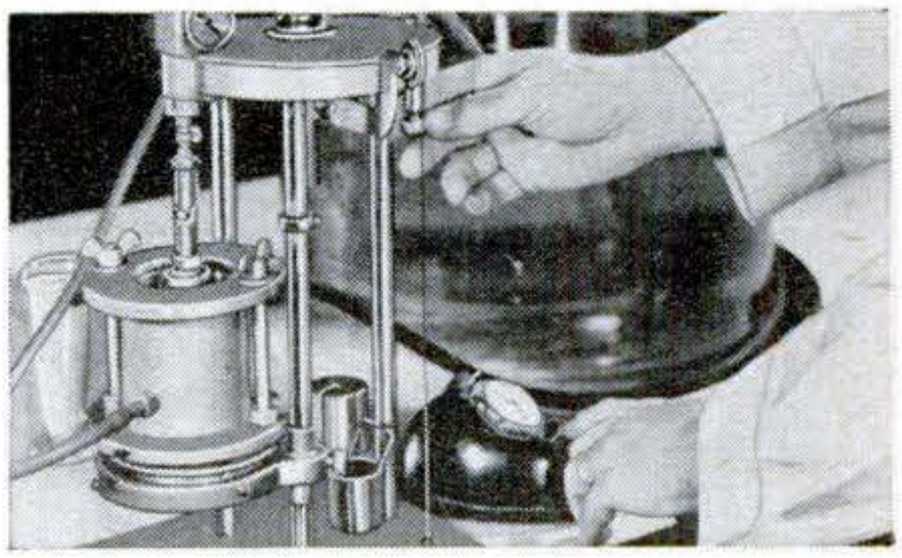
FREE: For full information on SWP House Paint and lots of interior decoration ideas, too, ask your dealer for a copy of the 44-page "*Home Decorator*" or write to The Sherwin-Williams Co., 1261 Midland Building, Cleveland 1, Ohio.



Tested for Your Protection . . . A most exacting procedure of quality-control testing through every step of manufacture, from raw materials to finished product, assures maximum beauty and protection in SWP House Paint. Laboratories in every Sherwin-Williams factory are charged with the responsibility of absolute quality control of every gallon produced.



White and Colors That Last . . . All over the country, in all climates, Sherwin-Williams maintains test stations where house paints of every type and description are exposed to years of weather and wear. SWP white that stays *whiter* and SWP colors that maintain their brilliance are the direct result of this painstaking research.



Ease of Application Assured . . . Invented by Sherwin-Williams Testing Laboratories, this instrument, known as the high shear viscometer, is an extraordinary development which makes possible the scientific measurement of the brushing qualities of paint. This testing procedure has made possible the superior brushing qualities in SWP House Paint which insure remarkable ease of application.

Let us recommend a reliable painting contractor.

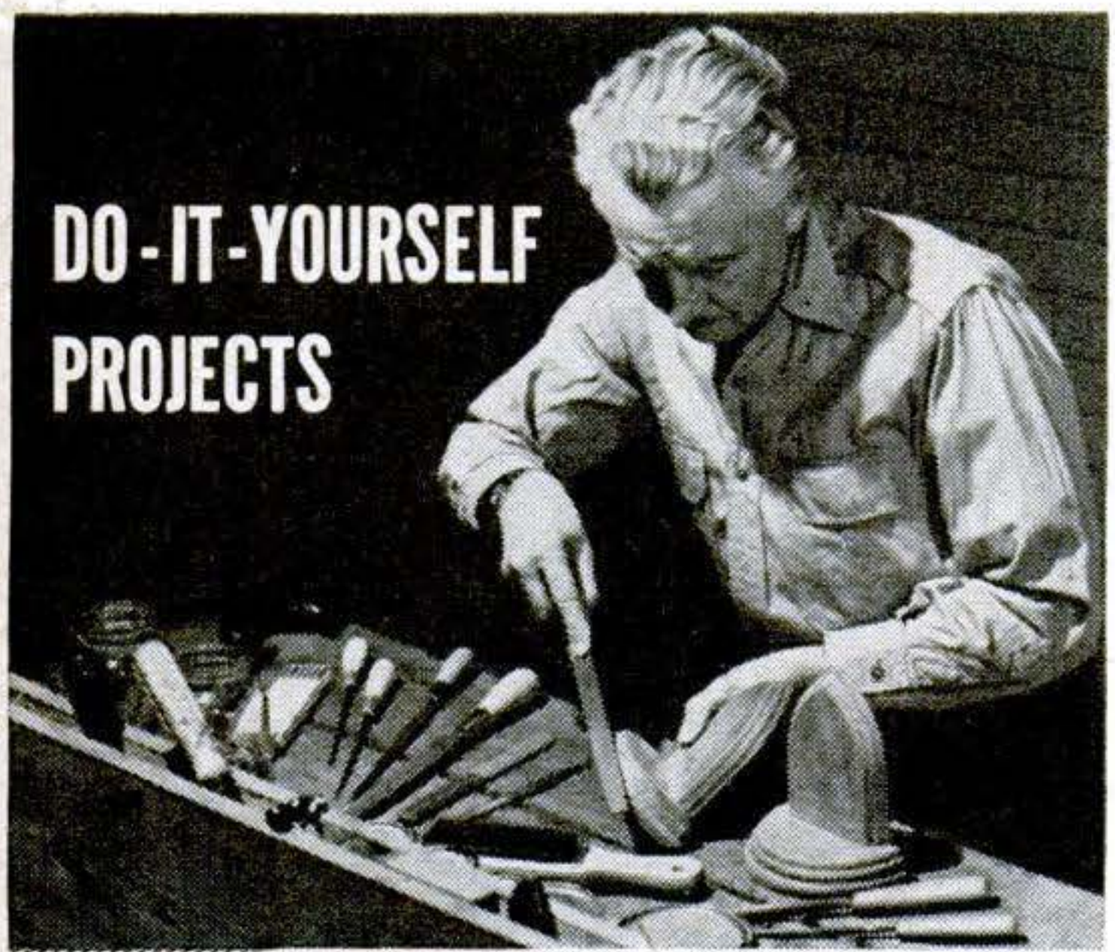
Go to the store that displays this famous trade-mark . . .

SHERWIN-WILLIAMS SWP HOUSE PAINT

ON TV . . . TUNE IN THE SUPER® KEM-TONE SHOW, STARRING RAY BOLGER . . . ABC NETWORK EVERY WEEK

Copyrighted material

Use good files on your

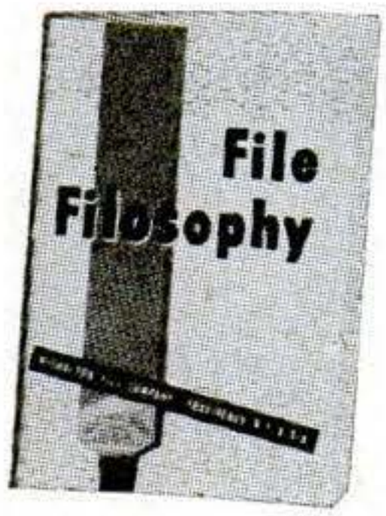


YOU really get the urge to make and repair things when the files you use are Nicholson or Black Diamond. There's a rare crispness in their bite, economy in their long-lasting sharpness, satisfaction in knowing that you have the world's finest.

The man in the picture is finishing off a pair of hardwood book ends, but even his modest assortment of these *good* files can take care of scores of jobs around the house, garage and workshop.

It's worth while going out of your way to get Nicholson or Black Diamond files, but most good hardware and tool-supply houses have them . . . because they know that "once a customer, you're *always* a customer."

FREE BOOK, *"File Filosophy,"* will help you on your Do-It-Yourself projects. It has 48 illustrated pages on kinds, use and care of files. *Send for it.*



NICHOLSON U.S.A.

NICHOLSON FILE CO.
19 Acorn Street
Providence 1, R. I.
(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ontario)

BLACK DIAMOND MADE IN U.S.A.

NICHOLSON FILES *FOR EVERY PURPOSE*

Look What's Happened to Trailers

[*Continued from page 120*]

fire departments, swimming pools, theaters, grocery stores, garages, restaurants and service by the school-district bus.

A total of 12,000 trailer parks, representing an investment of $250,000,000, serves the U.S., but probably only a third are of the larger type described above.

As for buying a trailer in the first place, it is a fairly painless transaction these days. Most purchase contracts call for one-third down, with a generous maximum of five years in which to pay off the rest.

Most states already charge personal-property taxes on trailers, and some areas are pressing for passage of trailer real-estate taxes, considering them, in actuality, houses. They have not been taxed as automobiles anywhere since 1951.

Trailer Driving Takes Practice

If you are among the 50 percent of all trailer owners who do not resort to being hauled by truck, you will find that towing a trailer is not difficult.

Backing comes with practice and ought to be done solo (to avoid taunts and jeers) in a large, open space. It is also helpful to spend a while down at the loading platform of your local supermarket, watching a "semi" driver do his stuff.

Braking is a distinctly delicate operation. Rule One is to apply the trailer's brakes (electric, air or hydraulic) gradually, before you apply those on your own car. Your car engine is a good brake and should be used often.

Cornering is one of the biggest problems. But all you have to remember to do is what would probably earn you a traffic fine if you were driving your car alone. That is, keep about seven feet from the curb and head for the middle of the intersection when you are about to turn right or left. Otherwise you may add those folks waiting on the corner to your passenger list. END

NEXT MONTH in* Popular Science: *The surprising luxuries you find nowadays when you stop overnight at a motel.

Copyrighted material

Get
PISTON RINGS
that are made right for your
FORD

Ford piston rings reduce break-in wear on cylinders. Top ring's chrome plating and second ring's phosphate coating make the difference. Bottom ring's expander adjusts to worn spots for pressure just right for Ford engines.

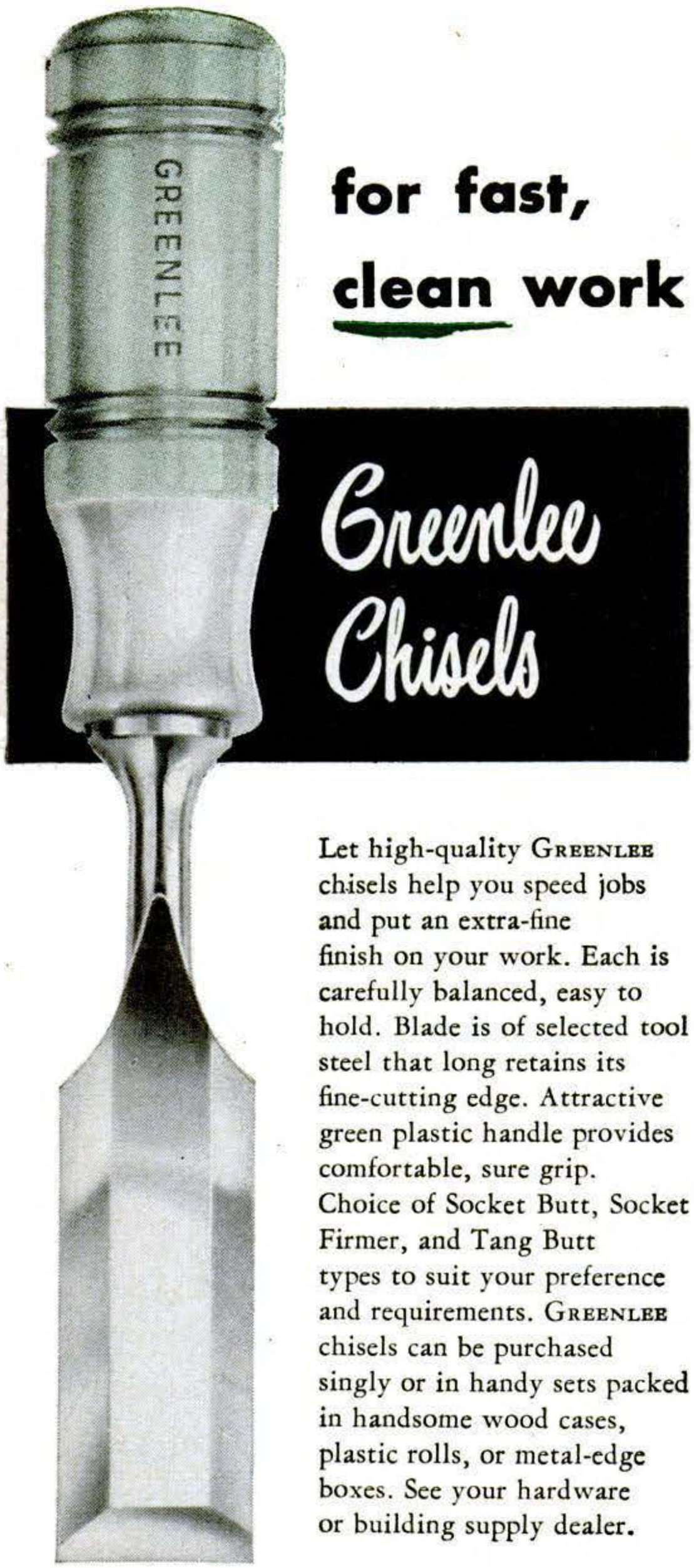
All Genuine Ford Parts—like the piston rings shown above—are made right . . . to fit the specifications set by the men who originally built your Ford!

With all the driving that lies ahead this summer, it's good to know your Ford will get full mileage out of the gas and oil you buy. That's why you should have your rings checked *now*. If new rings are needed, be sure you insist on Genuine Ford Piston Rings. They mean longer piston life, better oil control, more power and economy. Like all Genuine Ford Parts, they're *made right* to work right to last longer in your Ford!

GENUINE Ford PARTS

WHEREVER YOU GO, INSIST ON

Copyrighted material



for fast, clean work

Greenlee Chisels

Let high-quality GREENLEE chisels help you speed jobs and put an extra-fine finish on your work. Each is carefully balanced, easy to hold. Blade is of selected tool steel that long retains its fine-cutting edge. Attractive green plastic handle provides comfortable, sure grip. Choice of Socket Butt, Socket Firmer, and Tang Butt types to suit your preference and requirements. GREENLEE chisels can be purchased singly or in handy sets packed in handsome wood cases, plastic rolls, or metal-edge boxes. See your hardware or building supply dealer.

TOOLS FOR CRAFTSMEN

GREENLEE

SPECIAL OFFER... GREENLEE Woodworking Calculator only 25c. Converts linear to board feet, gives nail specifications, tool sharpening tips. Compares woods, gives bit sizes for screws, concrete mixes, painting information, etc. Convenient ... simple to read. 6" diameter circular shape ... heavily varnished cardboard. Send 25c (no stamps please).

GREENLEE TOOL CO.
2126 Columbia Ave., Rockford, Illinois

The Car That Has Changed the Most

[*Continued from page 142*]

enjoyed a flashy transitory existence in harness with a gasoline engine. This teamwork went on beneath the handsome and ponderous body of the Owen Magnetic, which weighed at least 600 pounds more than a gasoline-powered car of comparable size and cost as much as $5,700.

In the Owen Magnetic, a gasoline engine was coupled to an electric generator to produce a magnetic field, which acted on an iron shaft connected to the driving axle of the car. By varying the intensity of the field, the car could be made to go faster or slower without a clutch.

The car at first was made by R. M. Owen of New York City, under license from Baker. In 1915, Baker's company bought out Owen's and made the Magnetic until the war abruptly shut off the supply of Continental and Buda gasoline engines that Baker had been buying.

Last of the Electrics

But while the Owen Magnetic—"Car of a Thousand Speeds"—lasted, John McCormack, Enrico Caruso and others, including the fledgling U.S. "Air Service," which felt able to afford a few for staff cars, loved it dearly.

The full-fledged electric car of prewar days never revived. Probably it never will, though a vigorous and revolutionary model, using a unique kind of torque multiplication, has been created recently by young Gerald Banning of Zilwaukee, Mich. (PSM, April '54, p. 144).

The chances are strong, however, that the energetic spirit of the original Baker Electric will long preserve the form of its fourth incarnation—the busy, popular industrial truck. Perhaps, though, to keep up with the times, it will soon have to start getting its current from a new source—atomic energy. END

This Is For Certain

To keep cake from getting stale, try putting it in a paper box in the children's room.—*Hudson Newsletter.*

Copyrighted material

QUICKER TAKE-OFF!

FASTER GET-AHEAD!

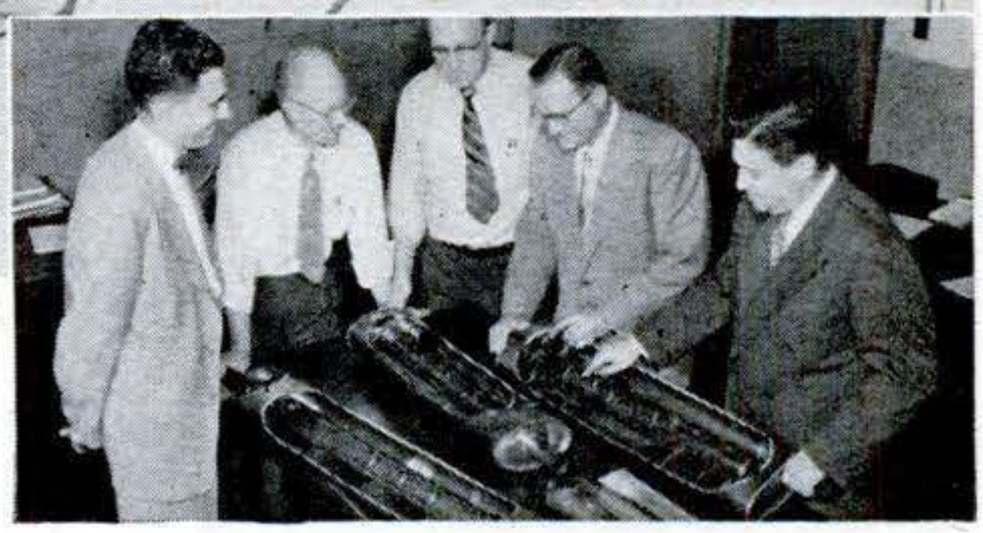
MORE PASSING POWER!

"SURE DOES BRING OUT THE GO FACTOR!"

SAYS

Wilbur Shaw

President, General Manager
Indianapolis Motor Speedway—
3-time winner 500 Mile Race Classic.



WALKER "PRECISION TUNING" GIVES YOU QUICKER TAKE-OFF, FASTER GET-AHEAD AND MORE PASSING POWER!

"Your muffler makes a big difference in how your car operates . . . just any old muffler won't do. To get full power from your engine that responds the instant you press the accelerator, you must have a muffler that brings out the Go-Factor.

"From the driver's seat of a new high horsepowered passenger car, I put Walker Silencers through their paces from a standing traffic start to top speed. Duplicating every driving condition that could affect muffler performance . . . uphill, downhill, fast, slow, under full load . . . or just cruising along—I kept my eyes on the tell-tale dynamometer dials. They told me the story . . . accurately as only a scientific instrument can.

"There is no doubt about it . . . Walker Silencers *do* bring out the Go-Factor of these new automobiles . . . their ability to get into quick motion—at the traffic light or on the open road."

WALKER MANUFACTURING COMPANY OF WISCONSIN • RACINE, WIS.
Exhaust Silencers · Oil Filters · Jacks

"CUT-AWAY WALKER 'PRECISION TUNED' SILENCERS for three new high-horsepower engines show the great difference in design and construction necessary to meet the particular exhaust problems of each engine. Every engine is an individual—what's good for one may be bad for another."

"ACCURATE BACK PRESSURE READINGS are shown on this instrument panel, and I saw with my own eyes the difference a Walker Silencer can make. The first rule of engineering here is—*a Walker Silencer must quiet an engine properly without increasing its back pressure.*"

Now . . . more than ever

WALKER *Precision Tuned* SILENCERS

Make the Difference!

FREE!
Send for full Wilbur Shaw report.

Copyrighted material

Quit driving an oil-burner—get new piston rings!

Oil pumping is just the start of expense and trouble—the first danger signal from worn-out piston rings. The longer you let those old rings stay in, the more oil you'll use, the more power you'll lose, and the bigger your repair bill will be!

As your engine gets older, it runs hotter because of accumulations in the cooling system. The cylinders wear tapered and out-of-round—need more oil on the walls.

It requires a special type of piston rings—replacement rings—to deliver this extra oil, under full control, without waste.

Hastings makes replacement rings exclusively, devotes all its research on the highways and in the laboratory, to the particular replacement problems of each make and type of engine.

That's why Hastings Rings *stop* oil-pumping, *check* cylinder wear, *restore* engine performance—in re-ring, re-bore and re-sleeve installations.

So go to your motor specialist at the first sign of oil-pumping or performance drop-off. If rings are the trouble, ask him to install a Hastings Steel-Vent replacement set. Truly the best money you can spend on your car! Hastings Manufacturing Company, Hastings, Michigan; Hastings Ltd., Toronto; Piston Rings, Spark Plugs, Oil Filters, Casite, Drout.

HASTINGS

STEEL-VENT PISTON RINGS

Regular or Chrome

Tough on Oil-Pumping
Gentle on Cylinder walls

How to Buy Binoculars

[*Continued from page 206*]

workmanship here—and, in all probability, elsewhere.

Beware of "square" exit pupils. A square of light may appear in the eyepiece if incorrect design reduces the amount of light getting through. The square edges are the sides of the prisms. This has no worse result than to dim the image a little. But it does reveal faulty design *inside* the glasses, where you could not otherwise examine them.

Are lenses coated, throughout? Coated lenses are one of the great optical advances of recent years. By reducing reflection, a transparent lens coating improves the image's brightness by cutting light loss and eliminates haze detracting from sharpness. Incidentally it gives the glass a straw-to-purple tint. All the glass-to-air surfaces should be coated. But, in poor imitation of better binoculars, cheaper ones may have lenses coated on the outside only.

You will not be fooled, if you hold the glasses so that you see an overhead lamp reflected in the objective lens. There will be a number of reflections, the largest being from the outer surface. If all are dull and tinted, all the lens surfaces are coated. If all but the largest reflection are bright and have the lamp's color, only the outer surface has been coated—the maker has skimped.

No tests such as these can promise to distinguish infallibly between a good buy and a poor one. But you'll be a lot wiser for making them, and they should be made. They'll go a long way toward telling you whether a pair of glasses is good enough to serve your purpose—and what the difference is, between low, medium and high quality in binoculars. END

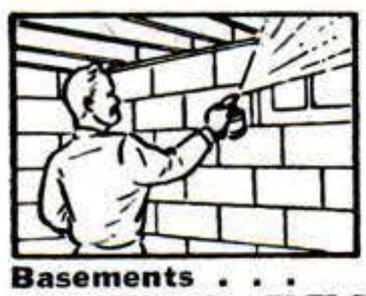
Wishful Thinking

When a retired locomotive engineer and his wife went on a vacation, she was determined to get his mind off railroading. She decided she had succeeded one day during the trip when they stood looking down into the vast depths of the Grand Canyon. The old hoghead's eyes were bulging like a tromped-on bullfrog's.

"Isn't it the most wonderful thing!" his wife exclaimed.

The old man finally spoke. "Man, oh man," was his awed reply, "wouldn't I like to moan my steam whistle in a hollow like that."—*C & O Tracks.*

Take The "PAIN" Out of PAINTING


Basements . . .

Fences . . .

Furniture . . .

USE A BECKER CO_2

SPRAY GUN

Take It Anywhere!
No Compressor . . .
No Electric Cords Needed.
Sprays: Paints, Oil, Varnishes Insecticides, etc.

Men! Women! Here's the easy way to lick those tough, tedious, tiresome paint jobs. Becker Spray Gun is fun to use, requires no electricity or compressors—pressurized by low-cost CO-2 cartridges each sprays up to 21 oz. containerful. Used 5 years successfully in industry.

SEE YOUR DEALER! If he cannot supply, order direct for pstpd. shpt. Extra cartridges 10 for $1.

SULLIVAN-BECKER CO.
Dept. 124-F Kenosha, Wis.

ONLY **$19.95** with box of 10 cartridges

EARN YOUR OWN KING MIDGET. We want rider agents to demonstrate and sell the World's Lowest Priced Two Passenger Automobile. Fully assembled or bolt together parts. If there is no dealer near you send 25c for detailed literature with dealers price or $1 (refunded first order) for this plus actual assembly book and service manual.

MIDGET MOTORS MANUFACTURING CO., ATHENS, OHIO

SPECIAL OFFER—Only 10¢
50-Page "Tools and Rules" Book

"The Tools and Rules for Precision Measuring" tells how to make accuracy a habit, shows the methods skilled mechanics use. 100 pictures plus reference tables. Send only one dime. Address Dept. PS.

Only 10¢

THE L. S. STARRETT CO. • ATHOL, MASS., U. S. A.

Cut glass easily
ask your dealer for
Red Devil
glass cutters

Red Devil Tools.

Get your FREE copy of "HOW TO CUT GLASS."
MAIL COUPON TODAY
Red Devil Tools. Dept. 125
130 Coit Street, Irvington, N. J.

NAME _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

2813

$5. for your old handsaw when you buy this New

Porter-Cable Homemaster

Electric Saw

Retail Price . . 49.50

Handsaw Allowance 5.00

YOU PAY ONLY

44.50

LIMITED TIME ONLY! Take your old handsaw to any Porter-Cable dealer in the U. S. He'll allow you $5.00 against the purchase of a brand new Homemaster 6" Electric Saw! But act soon—remember, this special introductory offer good only until midnight, August 6th, 1954.

Every Practical Feature which Porter-Cable has developed in nearly 50 years of quality tool making is included in this outstanding portable electric saw . . .

6-Inch Combination Blade—cuts 2" dressed studding, joists, and other lumber.

Kickproof Clutch — eliminates kick-back, saves wear on gears and motor.

Telescoping Guard—keeps blade safely covered on every type of sawing job.

Precision Ball Bearings — provide longer wear without repair.

Big 8 Amp Motor—delivers all the power needed for the toughest materials.

Simple Adjustments—for depth and angle of cut, set with two fingers.

Fully Guaranteed—against defects in materials or workmanship. Your money back if not completely satisfied!

Here's Your Big Chance!

Say goodby to tiresome hand-sawing! Take advantage of this exceptional limited-time offer . . . see your Porter-Cable dealer soon. Or write for list of dealers nearest you.

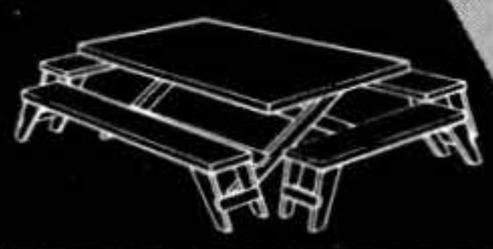
Porter-Cable Machine Co.

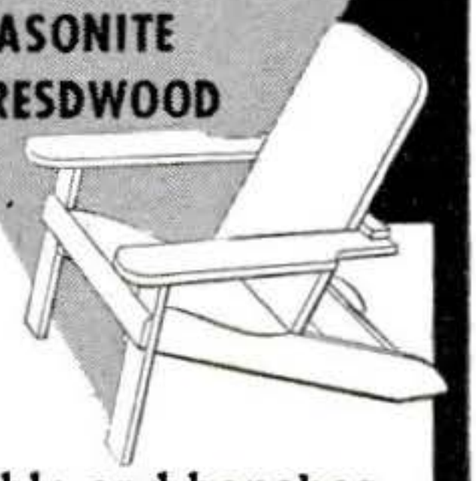
2466 N. Salina Street Syracuse 8, N. Y.

Manufacturers of Speedmatic & Guild Electric Tools

Copyrighted material

lawn chair and picnic table ... easy to make with MASONITE PRESDWOOD





Have fun all summer—save money! Plan AE-279 shows how to make comfortable lawn chair, "no-tip" table and benches. Table comes apart for storage. Weather-resistant panels of Masonite Presdwood® work, finish like wood. Last a lifetime. See your building materials dealer for the 33 types and thicknesses of Presdwood.

NATURALLY STRONGER WITH LIGNIN

PRESDWOOD WOOD MADE BETTER

MASONITE® CORPORATION
Dept PS-6, Box 777, Chicago 90 Ill.

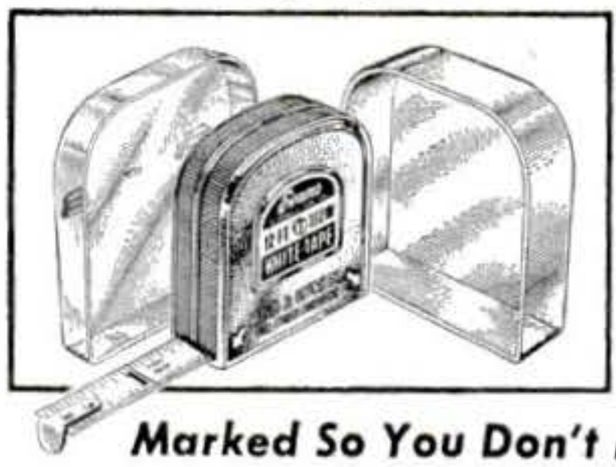
Please send me plan No. AE-279 for Lawn Chair and Picnic Table. I am enclosing 10¢ to cover handling and postage.

Name.....
Address.....
Town.....Zone.....
County.....State.....

"Masonite" signifies that Masonite Corporation is the source of the product

NEW 12-FT. POCKET TAPE
MAKES L-O-N-G MEASUREMENTS EASY
made only by EVANS

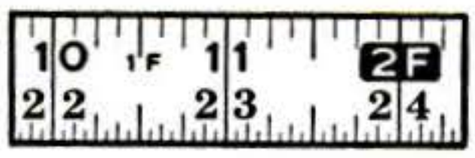
Only $1.89



No longer need you make two measurements for 12-ft. jobs as you must do with shorter tapes. Chrome-plated case is no larger. Each EVANS Tape packed in FREE transparent Tenite utility case.

Marked So You Don't Have To Figure
No Other Tape Is Marked This EVANS Way

Work in feet and inches? Read here
Work in inches? Read here



King-Size 10-Ft. White-Tape
STANDS UP STRAIGHT
For Upright Measurements!

Wider (3/4") heavy-duty blade makes those long upright measurements easy and accurate. Exclusive EVANS double markings, same as 12-ft. pocket tape. FREE belt clip and Tenite utility case with every EVANS King-Size.

Only $2.39

At hardware stores everywhere in U.S.A.

2642

Evans & CO., Elizabeth, N. J.
Makers Of Evans "Long Tapes"—25-50-75-100 Ft.

Want to Climb a Mountain?

[Continued from page 93]

spot they could reach before sundown. On this ledge, smaller than many pantry shelves, they spent the frosty night. They ate chocolate bars, raisins and canned salmon to keep up body heat. The two men had tied themselves to the rock for safety, but their boots dangled out over eternity.

Regardless of how difficult the climb, supply is rarely a critical problem in the Canadian Rockies. Assaults against some of the most perilous mountains in the world still permit an alpinist to be back at a fashionable inn for a full-course dinner in the evening—if he survives. In fact, the sheerest peaks rise out of the gentlest valleys, and these valleys have been a route of empire for Canada's transcontinental railroad systems.

Mountaineering and Golf Side by Side

Mt. Colin, a modest 8,515 feet in height, looms barely more than a long tee shot from the picturesque 18-hole Totem Pole golf course at Jasper Park. The mountain rises directly above the CNR main line and the automobile road leading to Edmonton. From the stony flanks of Mt. Colin, a climber with 20/20 vision might make out the digits on a diesel-electric's number plates.

Yet this peak so close to civilization is one of the most stubborn ascents on the continent. Its cliffs are vertical and practically smooth. The distances between ledges call for risky leaps. Ridges are so sharp that even skilled climbers are reduced to the indignity of straddling them on the seats of their trousers. Visitors from Switzerland have compared Mt. Colin to the needlelike *aiguilles* in the Alps, those granite steeples that only the steadiest Swiss guide can climb.

The most tempting ascent to Americans visiting the Canadian Rockies is likewise half-circled by a railroad track. Mt. Eisenhower, named in 1946 in honor of the wartime leader of the victorious Allied military forces, lies a trifling lunch-basket hike away from the winding

[Continued on page 258]

Copyrighted material

If you have a saw

Do as carpenters do—fill all cracks and saw marks with smooth-finish Plastic Wood. Plastic Wood handles like putty and hardens into real wood.

YOU NEED "PLASTIC WOOD"®

SHOPMASTER'S

NEWEST SENSATION

COMBINATION POWER TOOL

For Complete Information Write Dept. 11L
1214 S. 3rd St., Minneapolis, Minn.

SHOPMASTER, INC.

#5 X-ACTO KNIFE $1.20

x-acto®

KNIVES • TOOLS
HANDICRAFT KITS

X-ACTO, INC.
48-41 Van Dam St.
Long Island City, N. Y.

Send 20¢ for 28-page Catalog

Make Money SELLING Eshelman Power-Mowers and DOING GARDEN WORK

SNOW PLOW
PLOWS
CULTIVATES
HARROWS
HAULS
SPRAYS
SAWS
DOZER
MOWS
CUTS
ROLLS
TILLS
RAKES

ESHELMAN

FOR BETTER LAWNS and GARDENS

Also Power Reverse. Women can operate it. Free Catalog. Write: ESHELMAN, Dept. 46, 119 Light St., Balto. 2, Md. 333 N. Michigan Ave., Chicago 1, Ill. 7070 Hollywood Blvd., Los Angeles 28, Cal.

Aladdin 3-IN-1 SAW

ATTACHES TO ANY ¼" ELECTRIC DRILL

A hack saw, jig saw and coping saw in one easy-to-use attachment! Fit into drill chuck and you're ready to saw. Fast and accurate. Cuts metal, wood, plastic, hardboard or wall board. Full 9/16" chip clearance. No gears, no bearings to wear out. Weighs just 11 oz.—handle folds for compact storage and blade protection. Ideal for sawing in those hard-to-reach plac s. With metal and wood blades (1 ea.), only **$4.95** postpaid. COD orders slightly extra. Sold with iron-clad MONEY-BACK GUARANTEE!

ALADDIN MFG. CO. DEPT. PS-1, 3125 HARRISON KANSAS CITY, MISSOURI

Shavings from the WIZARD'S WORKSHOP

by the Weldwood Wizards with Wood

WHAT'S YOUR "SHAVING?" *Want your short cut or shop trick printed? Send it to United States Plywood Corp., Box 110, N.Y. 36, N.Y. If used, we'll send you a one year subscription to this magazine. All entries become our property. None can be returned. Keep 'em short—35 words or less.*

CAN'T GET AROUND? A handy large-radius compass is made with a strip of wire screen cloth. Use a glass headed push pin for the center; a pencil or awl for marking or scribing the circle.

A NATURAL FOR WOOD! Here's an easy way to get that costly hand rubbed look when you want a natural finish on wood. For a wizard job use Satinlac! Works fine on any wood—hard, soft, solid or ply. Protects and preserves the surface. Never looks "built-up"; never turns yellow or darkens with age.

PIN UP: Instead of plugging screw holes, try using brass countersink screws. Make countersink shallow, so that screw slot is above wood surface. Screw work tightly (best to glue it, too) then file off head of screw flush with wood. Looks like a decorative brass pin.

HOW TO GLUE JOINTS TO STAY: You need never worry about a joint glued up with Weldwood Plastic Resin Glue. It makes a bond stronger than the wood itself. And it gets stronger as it ages. Always in perfect condition when you want to use it, because you mix it yourself from the powder, in a few seconds. Stain free, rot-proof, highly water resistant, inexpensive. America's largest selling wood glue.

QUICK CLEAN HANDS. A dab of cotton soaked with ordinary finger-nail polish remover works fine to take paint, varnish, etc., off your skin.

PREFER BLONDES? You can get those rich "woodsy" blond or pickled effects by using White Firzite on any wood: hard, soft, 'ply or solid. Or for pastel tones, tint White Firzite with colors-in-oil. It gives an easy, amazingly beautiful finish!

PAINTER'S SECRET: Just brush Clear Firzite on plywood to prevent "wild" grain. It's also a wonderful undercoater on any paint or enamel jobs.

*TRADEMARK

WELDWOOD®
Plastic Resin Glue
Makes a bond stronger than wood itself. Highly water resistant.

FIRZITE®
White for pickled or blond effects. *Clear* tames wild grain on stain jobs.

SATINLAC®
For exquisite natural wood finish. Enhances natural grain; preserves the surface.

At hardware, paint, lumber dealers.

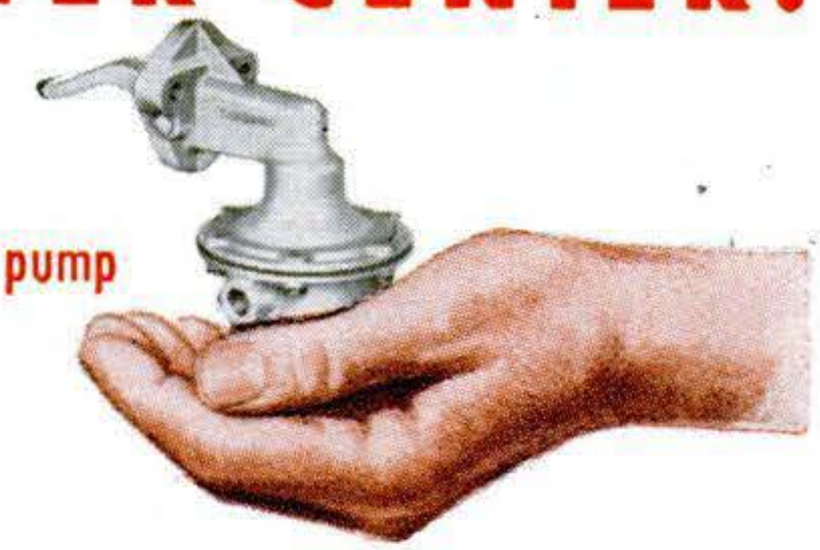
United States Plywood Corporation
Dept. 110, 55 West 44th St., New York 36, N. Y.
Send me free leaflets on Weldwood Plastic Resin Glue, Firzite and Satinlac.

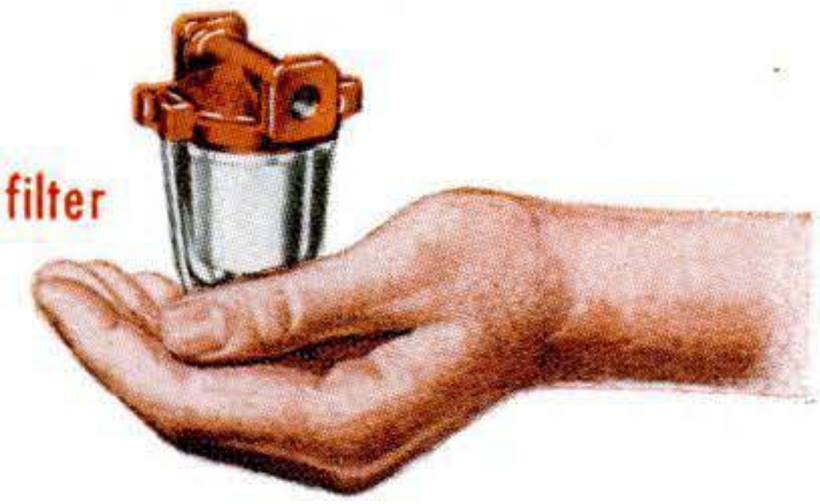
NAME_____

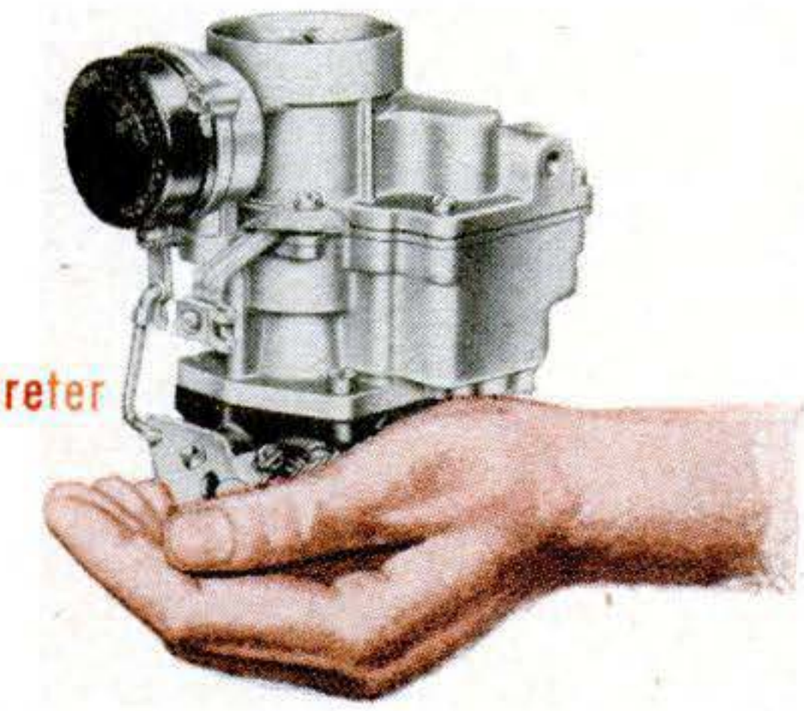
ADDRESS_____

Copyrighted material

Make sure of your
POWER CENTER!


CARTER fuel pump


CARTER fuel filter


CARTER carbureter

Protect your car's performance with the
CARTER
POWER CENTER® LIFE-LINE

Enjoy the smoothest-working, best-performing fuel system you can put on your car.
See your nearby Carter dealer. His address is listed in the yellow pages of your phone book.

CARTER CARBURETOR CORPORATION
St. Louis 7, Missouri
Division of American Car and Foundry Company

Want to Climb a Mountain?
[Continued from page 256]

route of the Canadian Pacific. Mt. Eisenhower, a stockade of turrets and blockhouses, was once known as "Castle Mountain." The last part of its 9,030 feet requires soft-soled climbing shoes and resistance to dizziness.

North of Colorado, the immense plateau that supports the Rocky Mountains gradually slants downward. This helps to explain some of the climbing dangers in the Canadian Rockies. The mountains may be less formidable in absolute altitude, but they tower far more impressively above their immediate bases.

For example, the lowest of all North American railroad crossings over the Continental Divide is that of the Canadian National in Yellowhead Pass, where the line girdles Mount Robson. It is only 3,717 feet in elevation. This totals barely more than a third of the elevation of the Denver & Rio Grande Western, on the 10,239-foot hump of Tennessee Pass in Colorado.

Ice Field Feeds Three Oceans

Geographers refer to the Canadian Rockies as the "hydrographic apex" of the continent. At no other place in the world are three major oceans fed from one frozen bosom. This cradle is the Columbia ice field, an immense natural refrigerator covering more than 150 square miles. It nourishes the foaming headwaters of the Columbia River, which flows to the Pacific Ocean. It feeds the sources of the North Saskatchewan, which surges to the Atlantic Ocean via Hudson Bay. And the Athabaska Glacier, a white tongue of the Columbia ice field, spawns the beginnings of the vast Mackenzie River, which meanders 2,500 miles to the Arctic Ocean.

Among the mountains to be climbed this summer by the ski expedition testing cold-weather equipment will be Snow Dome, 11,340 feet in height. This one peak has ice on its vertical flanks that pours into all three of the above river systems. In fact, the party's highest biv-

[Continued on page 260]

Copyrighted material

Brand New! WAR SURPLUS Released Since KOREAN TRUCE

BRAND NEW!
RUGGED!! **25 TON** MASSIVE!!
CAPACITY

HYDRAULIC CYLINDER

- ALL STEEL CONSTRUCTION
- 8"BORE—15" STROKE
- DOUBLE ACTION

ITEM #1815
- 50,000 LBS. PRESSURE WITH 1000 P.S.I. PUMP OUTPUT.
- UP TO 70,000 LBS.—CAPACITY ON INTERMITTENT SERVICE.
- SOLID STEEL 2½" PISTON ROD
- 1" PORTS
- OVERALL DIAMETER—10½"
- DISTANCE BETWEEN CENTERS—28¼" CLOSED—43¼" OPEN.

IDEAL FOR:

★ HYDRAULIC PRESSES ★ DUMP TRUCK HOISTS ★ TD-18, TD-24 INTERNATIONAL HARVESTER DOZERS AND GRADERS ★ LEVELING RAMPS ★ INDUSTRIAL MACHINERY ★ ROAD MACHINERY ★ FARM MACHINERY ★ HYDRAULIC TAIL GATES

Replacement cost—$360.00.
Shipping Wt.—185 lbs.
SPECIAL PRICE
F.O.B. Chicago..... **95.00**

ITEM #1715
- 7¼" BORE—15¼" STROKE
- 41,300 LBS. PRESSURE WITH 1000 P.S.I. PUMP OUTPUT.

OTHER FEATURES SAME AS ABOVE
Replacement cost $260.00.
Shipping Wt.—155 lbs.
SPECIAL PRICE
F.O.B. Chicago..... **80.00**

SELF-PRIMING

HAND FLUID PUMP

WITH STRAINER

ITEM #129—Type D-2—May be used as a boat bailing pump, sump pump, barrel pump, fuel transfer pump, for water, oil, gasoline, insecticides, etc. Bronze and aluminum construction. ¾ in. pipe thread ports. Fine general utility hand pump. Capacity—300 Gal. per hour. Ship. wt. 6 lbs.
F.O.B. Chicago **11.95**

FREE SUMMER EDITION

1954 CATALOG, 52 PAGES, chuck-full of unsurpassed War Surplus Equipment Bargains for farm, home, factory and workshop. Write letter today.

FOUR-WAY OPEN CENTER

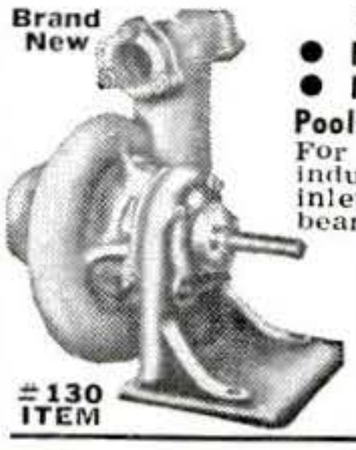
CONTROL VALVE

ITEM #126—Four-way open center control valve, with built-in adjustable relief valve factory set at 1000 P.S.I. Spring loaded neutral position. For use with one double acting cylinder. In neutral position cylinder is locked and pump unloaded. Can be used as single unit or mounted in series. Has ¾" pipe thread inlet and outlet. ½" pipe thread cylinder ports. Newly manufactured to our specification. Ship. wt. 8¼ lbs.

AN OUTSTANDING BUY!
21.50
F.O.B. Chicago

CENTRIFUGAL PUMP

GENERAL MOTORS —ALLISON



Brand New
#130 ITEM

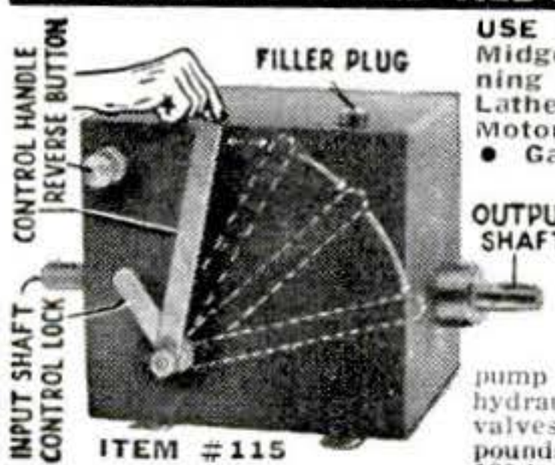
200 GALLONS Per Minute

- For Draining Basements
- Fire Fighting
- Irrigation
- Fuel Transfer
- Swimming Pools
- Home Water Systems
- Dewatering

For high volume commercial, home and industrial use. Standard 2½" pipe thread inlet, twin 1¼" pipe thread outlets. Ball bearing supported ¾" shaft. Easy priming. Rotation, counter-clockwise facing shaft. Gov't. acq. cost $145.00. Complete with full instructions. Ship. wt. 35 lbs.
F.O.B. Chicago..... **39.50**
Will deliver 200 gals. per min. against 65 ft. head using 5.2 H.P. at 3500 R.P.M.

HYDRAULIC SPEED REDUCER

with FINGERTIP CONTROL



ITEM #115

USE FOR: • Reamer Drives • Midget Cars • Feed Mills • Canning Machines • Conveyors • Lathes • Milling Machines • Motor Boats • Cream Separators • Garden Tractors • Pumps

Variable output speeds from 0 to input speed available by moving control handle. Locking handle maintains setting. Use input power of ¼ to 1½ H.P. This Westinghouse-Oil Gear Unit consists of a variable displacement hydraulic pump feeding a fixed displacement hydraulic motor. Adjustable relief valves set at factory for 100 inch pounds of torque may be reset up to 180 inch pounds. Independent reverse control allows full output power and speed selection in either direction of rotation. Shafts measure ⅝" diam., include keyway. Input rotation is counter-clockwise facing shaft. Recommended input speed not to exceed 750 R.P.M. Over-all dimensions, 7½"x 7½"x11½", Gov't. acquisition cost $428.00. Shpg. wt. 31 lbs. Complete with 2 qts. of oil and full instructions. F.O.B. Chicago..... **54.50**

300 AMP.

D. C. GENERATORS

IDEAL FOR WELDING GENERATOR

ITEM #91

Type R-1, rated 300 Amps. — 30 Volts. Mfd. by Jack & Heintz. Government Acquisition Cost$380.00. Shpg. wt. 55 lbs. Dimensions 16"x10"x7".
F.O.B. Chicago **35.00**

ITEM #90—Type P-1, rated 200 amps.—28 Volts, 2500 RPM. Mfd. by General Electric, Ford, Delco-Remy and Westinghouse. Gov't. Acq. Cost $300.00. Shpg. wt. 55 lbs. Dimensions 15"x9"x6".
F.O.B. Chicago..... **22.50**

HEAVY DUTY RHEOSTAT

ITEM #372—Use—for controlling field current of A.C. and D.C. generators; for battery charger control; for lighting dimmers; speed controllers, model railroad voltage controller. Manufactured by Ward-Leonard. 12.5 ohms, 10 to .3 amps. 350 watts capacity. Designed for baseboard or panel mounting. With pointer knob **9.95** Postpaid

BRAND NEW! JUST RELEASED!

BLACKHAWK HAND-HYDRAULIC PUMP

ITEM #82—Perfect for Hydraulic Presses, Snow Plows, Farm Wagons, Jacks, and Farm Plows.
A few easy strokes of the 20" handle and you can lift 5000 lbs., using Item 355—Hydraulic Cylinder.
Blackhawk Model P-151—complete with built-in oil tank and release valve.
Rated 1200-8400 lbs. per square in. Dim.: 9"x7"x6". Ship. wt. 35 lbs. Worth much more. F.O.B. Chicago..... **22.50**

ORDER DIRECT FROM AD
SATISFACTION GUARANTEED
SEND PAYMENT OR PURCHASE ORDER TODAY

TO PLACE PHONE ORDERS CALL WEbster 9-3793

GROBAN SUPPLY CO. Dept. PS-6
1139 S. WABASH AVE., CHICAGO 5, ILL.

For lawn mowers

New 3-in-one Oil-Spra lubricates all over —forms a barrier against rust! Press button for penetrating oil spray!

"3-IN-ONE" OIL®

MAKE YOUR OWN

POWER LAWN MOWER

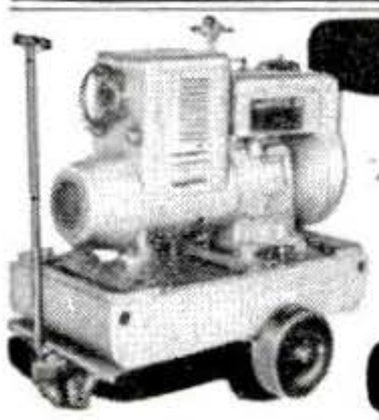
with this DRIVE CUTTER ASSEMBLY

ONLY **$13.95**

For those who desire to build their own power mower. Complete with 20" blade and double ball-bearing drive. Only $13.95.
Send check or M.O. Add 50c to cover handling and shipping.

SEND FOR **FREE** Power Mower Catalog

ATLAS KEEN MOWER
229 Southwest Blvd., Kansas City 8, Mo.



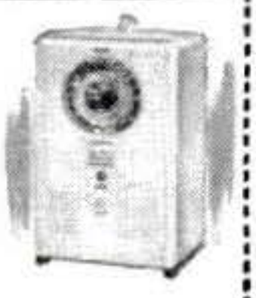
Low Cost "Husky Boy" Welds Anywhere! Earns BIG PROFITS!

Air-Cooled Engine Drive "Husky Boy"

Cash in on the profitable outside emergency repair jobs with the lightweight, easily portable, "Husky Boy" 200 amp. arc welder. For in or out of shop welding you'll get years of dependable service at a low investment cost. Wheels and handles available at slight extra cost.

"Build Your Own" AC welder, AC power. Operates away from power lines. Ask for details on generator only.

Transformer Type A.C. Welder



HOBART Brothers Co., Box P-64, Troy, Ohio Phone 21223
"One of the world's largest builders of arc welders."

Mail this Coupon!

Get started now in arc welding and increase your earnings. There's a big demand for weldors. Simply check the items below for complete information.

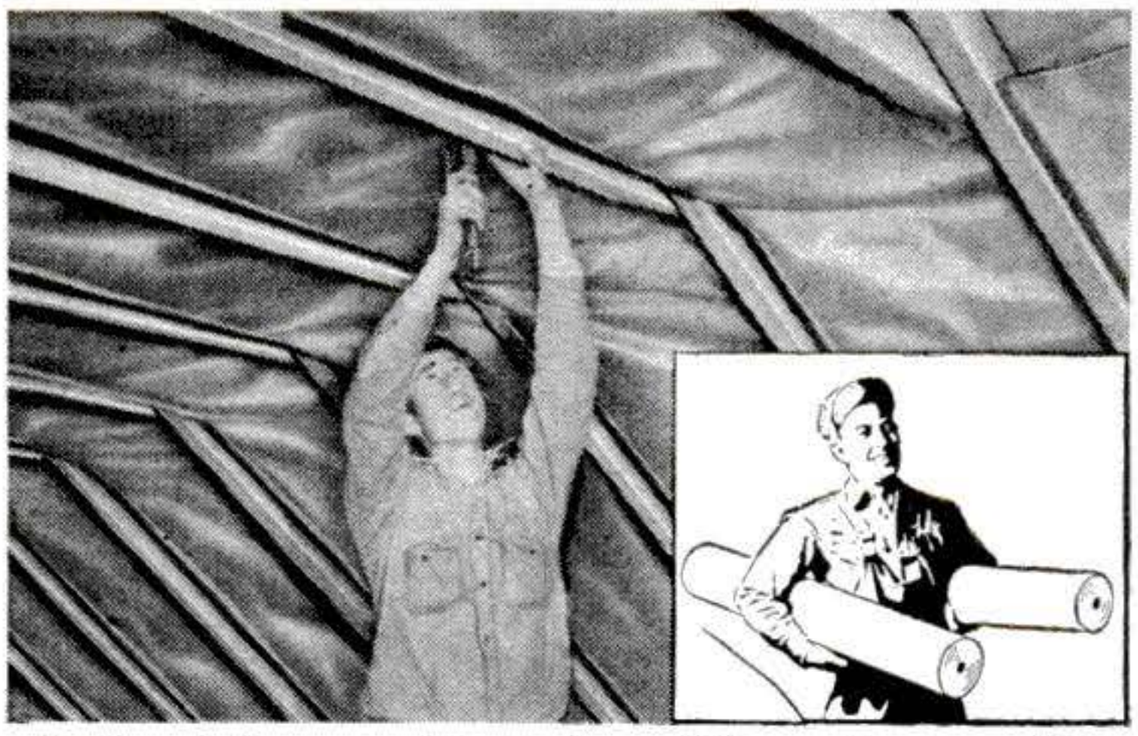
- ☐ Hobart "Husky Boy"
- ☐ Transformer Type AC Welder
- ☐ Hobart Trade School
- ☐ FREE Weldor's Vest Pocket Guide.

Hobart Bros. Co., Box P-64, Troy, Ohio

Copyrighted material

Simplest, Lowest-Cost

RADIANT HEAT REFLECTOR!

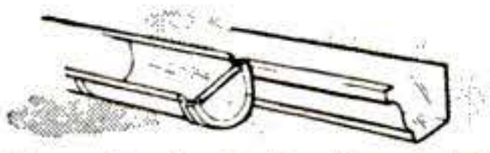


Shut out Summer Heat, Save Winter Fuel—with

REYNOLDS ALUMINUM REFLECTIVE INSULATION

This low cost, readily installed aluminum foil bonded to tough kraft paper in walls or attic provides real insulation. Keeps winter heat in, summer heat out! Costs only about $40 over ceilings of average 6-room house! Clean, odorless, pliable. Perfect vapor barrier, fire-retardant. Readily tacked or stapled over ceilings, under rafters, between wall studs, under ground floors. Rolls 250 sq. ft., 25", 33", 36" wide. Makes great reflectors for radiators, photolights, etc. Mail coupon for *free samples.*

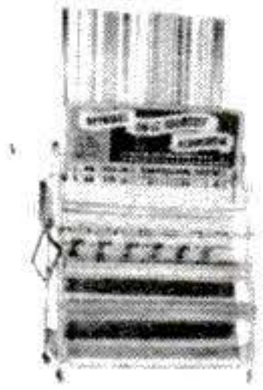
ALUMINUM GUTTERS



Easy to install, slip joints —no soldering. Non-staining. Cost much less than other rustproof materials.

Aluminum Nails. Rustproof, never stain, stay tight.

REYNOLDS *Do-It-Yourself* * ALUMINUM



New kind of aluminum —easy to saw, drill, join, shape with ordinary woodworking tools.

At hardware and lumber supply dealers.

*Reg. U.S. Pat. Off.

See your Building Supplies or Hardware Dealer

REYNOLDS *Lifetime* ALUMINUM BUILDING PRODUCTS

SEE "MISTER PEEPERS," starring Wally Cox, Sundays, NBC-TV.

MAIL THIS COUPON NOW!

Reynolds Metals Company
Building Products Division
2032 So. Ninth St., Louisville 1, Ky.

Send full information and FREE SAMPLES of Reflective Insulation. Also full details about

☐ Gutters & Downspouts ☐ Nails ☐ Flashing

Name_____

Address_____

City_____ State_____

Want to Climb a Mountain?

[*Continued from page 258*]

ouacs will be on the shifting surface of the Columbia ice field itself.

Because of the crevasses, some of the skiing will be done with the eight members of the expedition roped together. This has required patient practicing in advance. The party is to be led by Norwegian-born Leif Alvaer, who is now a Canadian citizen. He is ranked as a foremost authority on cross-country and mountain skiing. Alvaer's party will consist of seven men and one woman, Peggy Austin, mother of two children and a former Canadian Ladies' Ski Champion.

High Calories, Low Weight

In addition to experimenting with clothing and nylon sleeping bags, the expedition will try to subsist on a daily food ration of only two pounds per person. Yet this diet will provide 4,100 calories, far more than the normal intake. Dehydration and compact meal rations will substitute nourishment for weight.

Besides trying several unclimbed peaks, the party will undertake the first ski ascent of 12,294-foot Mt. Columbia, second highest summit in the Canadian Rockies.

Brigadier Sir Oliver Wheeler, who is president of the Alpine Club of Canada, explains that it is difficult to estimate the number of unclimbed mountains in his country because so many noble peaks still are without names. Many of the most spectacular of these lie north of the Canadian National Railways, in what is known as the Lloyd George Range of the Rockies. This saber-toothed wall forms a jagged and mysterious skyline, when viewed from the Alaska Highway.

This summer—and for many summers to come—adventurous men and women will be clinging to its vertical sides, climbing to mountaineering fame. END

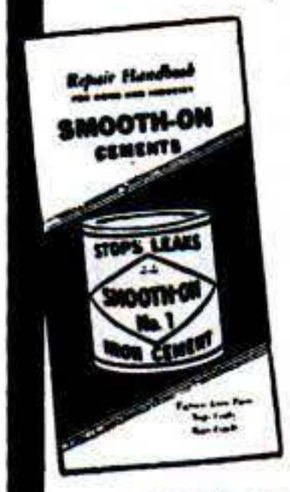
No Idle Moments

One thing you can learn by watching the clock is that it passes the time by keeping its hands busy.—*L & N Magazine.*

Copyrighted material

It's easy to make these REPAIRS

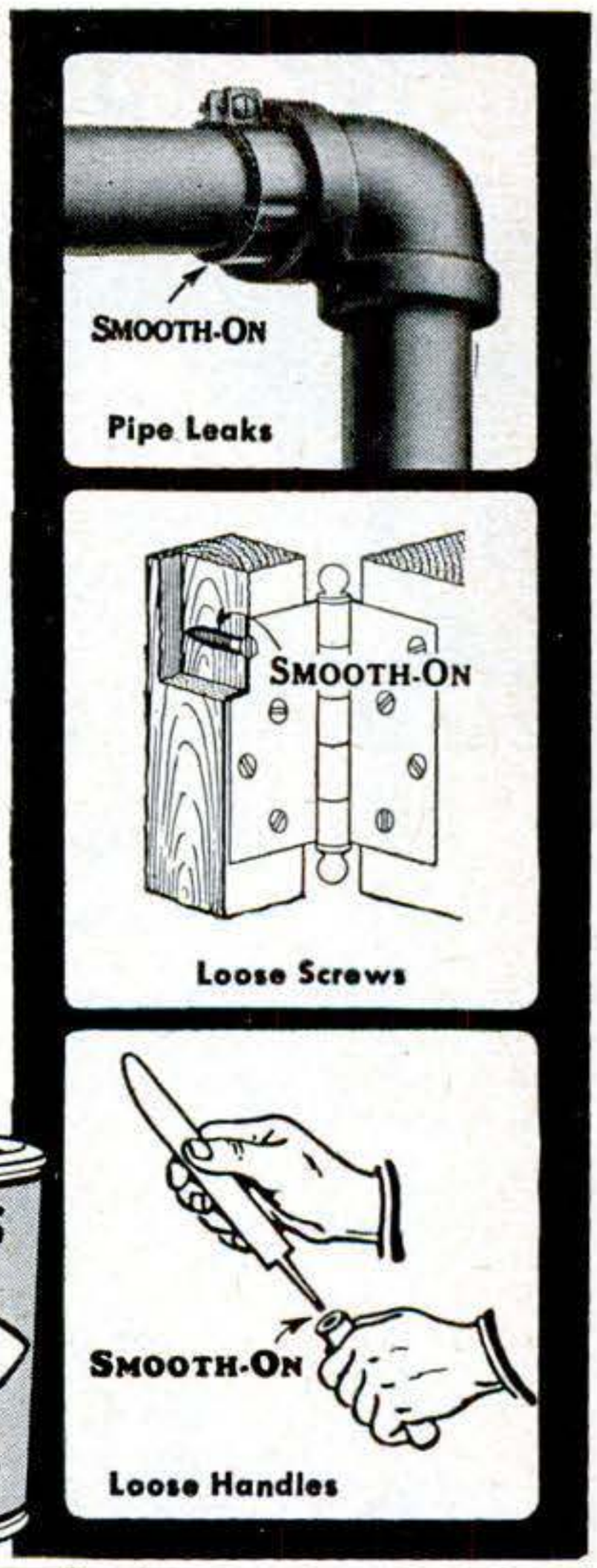
You can make loose metal, wood, or plastic parts tight; anchor bolts in concrete to stay; seal cracks in metal; tighten loose screws and fixtures in wood, metal or tile—with Smooth-On No. 1, the iron cement of many uses. Just mix, and fix. Smooth-On No. 1 hardens quickly like iron, and expands as it sets. Forced into any opening, its unique expanding action makes the repair. Keep a can on hand, it will not deteriorate. Smooth-On No. 1 is at your hardware store.



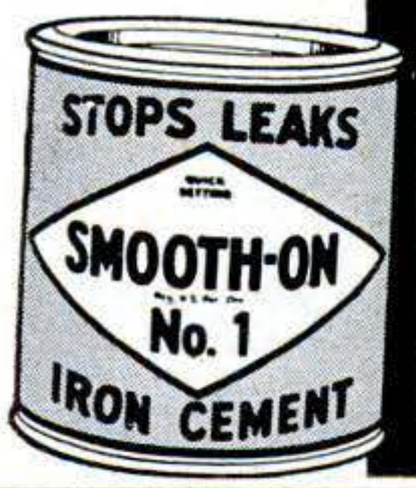
FREE *Repair Handbook*

48 pages, many illustrations, easy directions for ingenious time and money saving repairs you can make yourself. Write for your free copy.

SMOOTH-ON MFG. CO., Dept. 58F
570 Communipaw Ave., Jersey City 4, N. J., U.S.A.



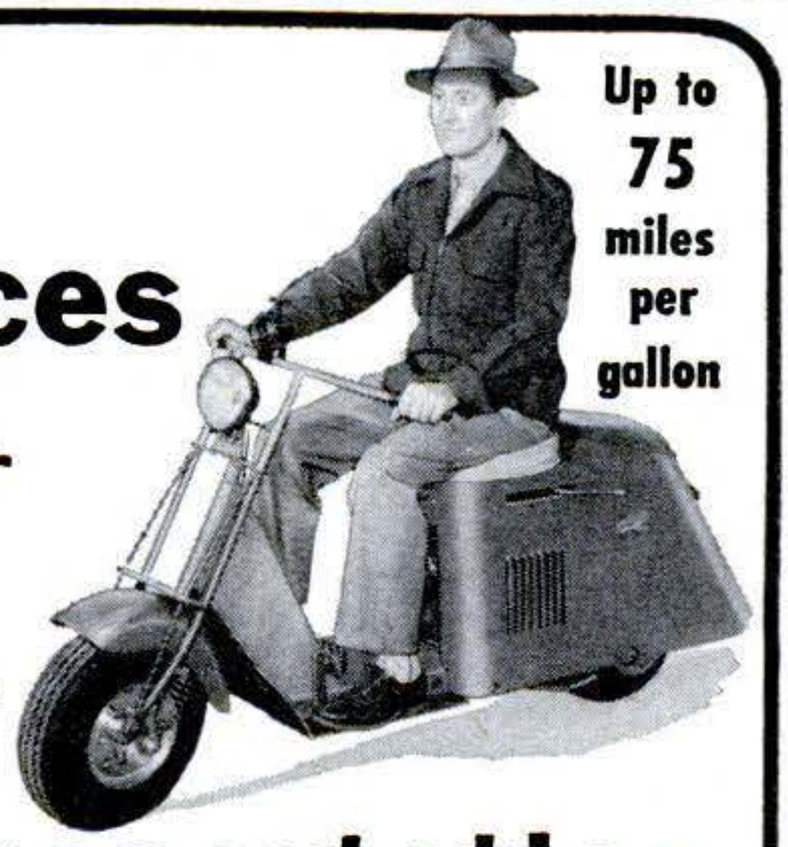
SMOOTH-ON



THE IRON CEMENT OF MANY USES

SO-391

ace of Aces in LOW COST transportation



Up to 75 miles per gallon

Cushman is the top card in the transportation deck for speed, power—low cost operation. Ride it to work, for sport, school, on errands, deliveries. You're set to go! No traffic or parking worries either. And total operating cost LESS THAN A PENNY A MILE!
See your nearest Cushman dealer for FREE demonstration.

CUSHMAN MOTOR WORKS, INC.
914 No. 21st St., Lincoln, Nebraska

New Formula Zips Off Paint!

X-CELL-ALL
No-Wash Remover with Dow Methylene Chloride

Remove old paint, varnish, lacquer, shellac with amazing X-CELL-ALL. Safe—won't burn! Start repainting as soon as old paint is off. Won't harm woods. At paint and hardware stores. Or send check for $4.25 gallon, $1.25 quart. Shipped postpaid. No C.O.D.'s.

Luminall Paints
CHICAGO 9, ILL.

Copyrighted material

Faster, Easier Gluing

with new squeeze bottle

Here's a ready-to-use glue that's strong enough for practically all your light woodwork projects and repair jobs. It's quick setting, dries clear . . . glues wood, paper, cloth and all porous materials. Try Elmer's Glue-All in the new, handy, plastic applicator bottle . . . get the large 8-oz. workshop size at leading hardware stores. Write for folder: The Borden Company, Chemical Division, Dept. PS-64, 350 Madison Avenue, New York 17, N. Y.

ELMER'S GLUE-ALL

Make your own
HUTCH CABINET
—a piece to show and own with pride

Standing 6′ high, this cabinet is 43½″ wide, 17½″ deep—offers ample storage and display space. A break-front display of china—with linen or silver in the drawers and cabinet below. Or—in the den—shelves and storage for books, records, etc. *You build without blueprints!* Our Simplified Easi-Bild* Pattern #270 shows how to cut and assemble your cabinet—specifies all materials. The Pennsylvania Dutch decorating design is included in the pattern. *You save up to two-thirds of the usual cost!*

The major material used is Homasote, Type RD—one of the strongest building boards you'll ever use—distributed by dealers throughout the United States and in Canada.

NEW! Three illustrated folders—suggesting 18 practical *make-it-at-home* projects, from a new room in the attic to a swimming pool. Clip or copy the coupon—mail today for pattern and/or folders. *T. M. Reg. Easi-Bild Pattern Company

***MAKE** it at home . . . with* **HOMASOTE**

HOMASOTE CO., Dept. 61, Trenton 3, N. J.
I enclose: ☐ 75¢ for pattern #270 ☐ 10¢ for 3 folders
NAME .....
ADDRESS .....
CITY ..... STATE .....
My lumber dealer is .....

What Makes the Earth Wobble

[Continued from page 99]

now without allowing for the change, your property would be rotated to the left almost six degrees. In other words, a resurvey of a thousand-foot boundary line that pointed due north 100 years ago would now miss the original line by 105 feet at the end.

The link is found. Geophysicists knew that for 400 years the greater part of the earth's magnetic field had been drifting westward—at the average annual rate of about 12 miles a year at the equator. But they had never had enough information to calculate the rate of drift over short periods. Studying his charts, Vestine found that about 1890 the drift had begun slowing down. By 1910 it had been only a few miles a year. Then it had begun speeding up.

This pattern matched the one found by the astronomers—the earth itself had slowed down between 1890 and 1910, thus making for longer days, and then had begun picking up speed.

In tracing the connection between the drifting magnetic field and the changing length of the day, a number of scientists have come up with approximately the same answer. These include Dr. E. C. Bullard and Dr. S. K. Runcorn of Cambridge University; Dr. W. M. Elsasser of the University of Utah; and Dr. Walter Munk and Dr. Roger Revelle of the University of California.

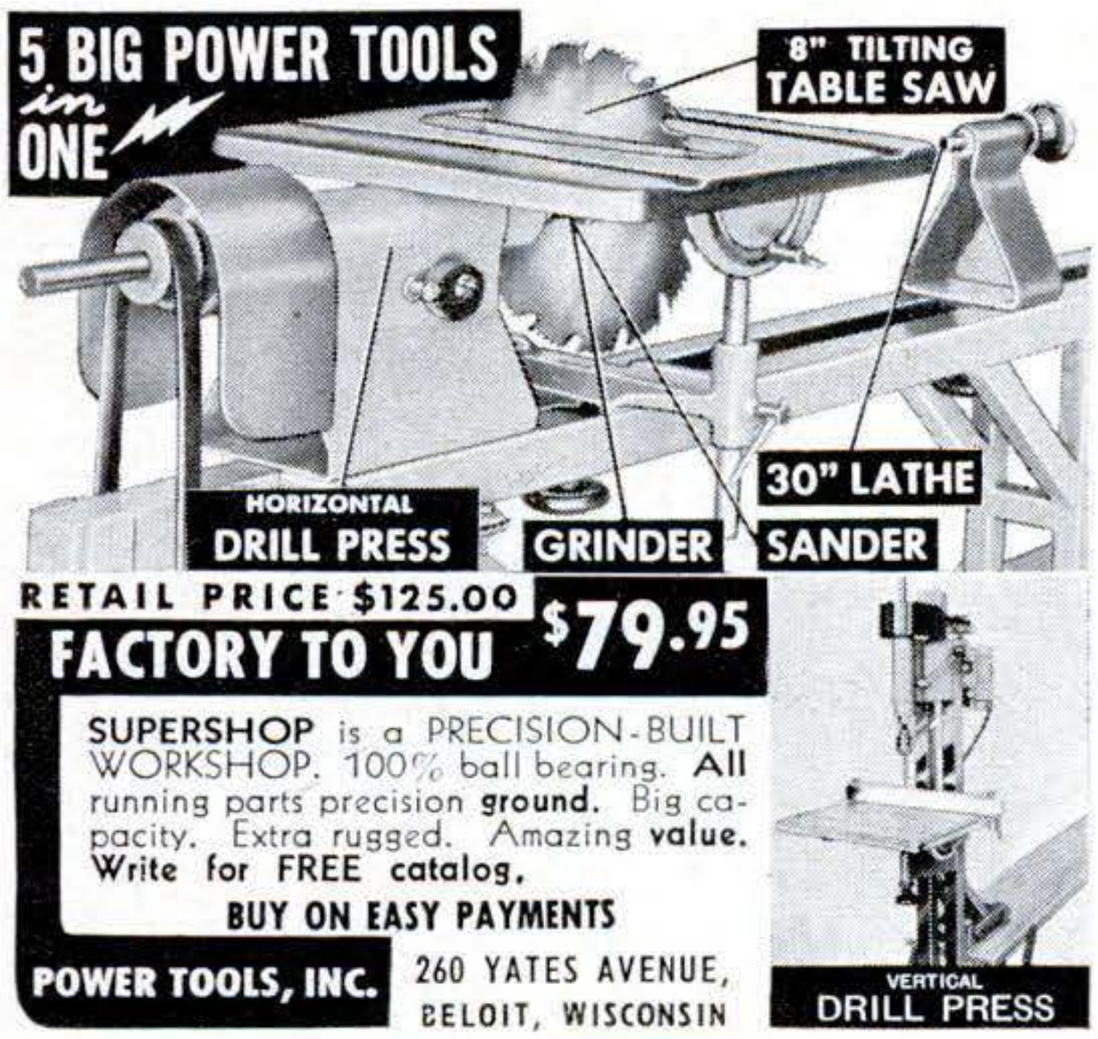
Magnetism starts way down. The magnetic field at the surface of the earth, these scientists agree, is an extension of one created within the core—presumably by an electric current located about 200 miles from the earth's center and circling around it.

The field drifts at the surface because the outer part of the earth rotates at a slightly different speed from the core. In effect, the core contains an engine that makes it speed up or slow down. Whatever the core does, the outer part does just the opposite—in order to obey the law of conservation of momentum.

The earth rotates from west to east.

[Continued on page 264]

Copyrighted material



RETAIL PRICE $125.00

FACTORY TO YOU $79.95

SUPERSHOP is a PRECISION-BUILT WORKSHOP. 100% ball bearing. All running parts precision ground. Big capacity. Extra rugged. Amazing value. Write for FREE catalog.

BUY ON EASY PAYMENTS

POWER TOOLS, INC. 260 YATES AVENUE, BELOIT, WISCONSIN

SACRIFICE SALE!

PRIZE WINNING MODEL AIRPLANE ENGINES

Were $14.95 NOW $6.95 postpaid

3 For $17.50 ppd.

WHILE THEY LAST!

We have a sacrifice lot of 3,000 Phantoms—the last lot which will ever be made—A-1, brand new, perfect. Guaranteed to be the .29 model which sold for $14.95 and won 2 national championships. Complete with operating sheet, decals, condenser, Smith (Firecracker) coil and lead wire. Order today, send check or M.O. Ironclad money-back guarantee—return in 10 days for full refund if not satisfied! Dealers inquire.

The AKRON 94 Akron Bldg., 4379 Sunset Blvd. Los Angeles 27, Calif.

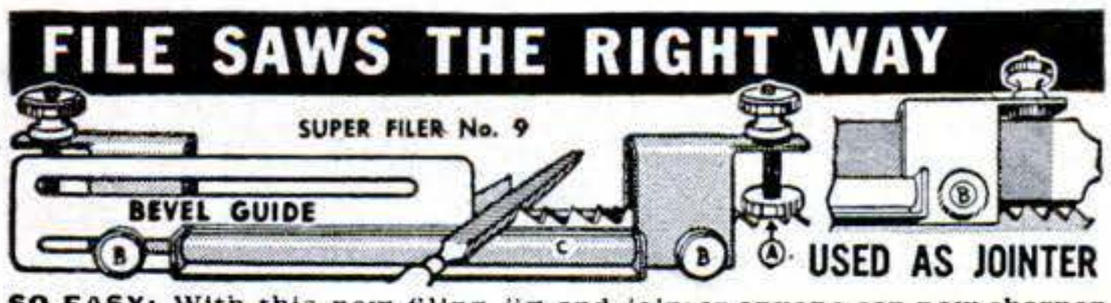
SHEET METAL BRAKES

Angles, flanges, Pittsburgh locks, 24 G. steel, heavier aluminum. Cam locking, mount on bench, truck or floor stand. Truss braced-steel. Express collect. 30", 65 lbs., $28.50. 36", 75 lbs., $33.00. 48", 100 lbs., $48.00. Also 8 ft. size. Floor stand, 22 lbs., $7.00. 15", capacity 16 gauge, 40 lbs., $21.50. **IRON BENDER** 1/4x3, **$9.50. TUBING BENDER**, 3/4"-1", **$6.00. SHEARS** 7 x 16 ga. steel, **$14.00;** 24" squaring and slitting shear, 24 ga., 16 ga. aluminum, **$38.00.** New **12" Vise Brake, $14.50,** P. Paid.

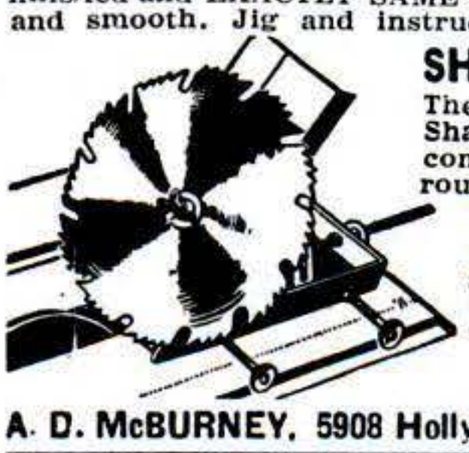
(Immediate delivery. Order cash or C.O.D., or send for folder)

VYKE MFG. CO., S-2439 15 St., Denver 11, Colo.

FILE SAWS THE RIGHT WAY

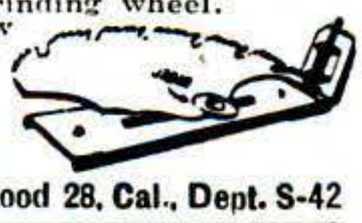


SO EASY: With this new filing jig and jointer anyone can now sharpen any handsaw like new! When file hits hardened steel rollers teeth are finished and EXACTLY SAME HEIGHT. All teeth cut and saw runs true and smooth. Jig and instructions **$2.95** postpaid. Free literature.



SHARPEN YOUR CIRCULAR SAWS

The RIGHT WAY on your own saw table. **Sharpens rip, cutoff, hollow ground and** combination blades—6" to 10". Saws stay round with correct bevel. Precision made. easy to use. GUARANTEED. Only **$8.95.** Includes $3.00 Grinding wheel. **"TRU-CIRCLE"** saw set automatically sets teeth at 10° or more **$2.95.**



AT DEALERS OR POSTPAID

A. D. McBURNEY, 5908 Hollywood Blvd., Hollywood 28, Cal., Dept. S-42

Service station proprietor Clark R. Cossé, Jr., of New Orleans, La.

"**SEE,** the book that came with your car* says—

Change your Oil Filter every 5,000 miles"

***17 out of 18 leading car makers recommend oil filter changes at least every 5,000 miles, on the average, depending on car and driving conditions.**

Grit and sludge in the oil stream can ruin your engine—lead to expensive engine repairs. A regularly changed Purolator† Oil Filter traps these dangerous contaminants . . . keeps them from damaging delicate engine parts.

Danger! If you've driven 5,000 miles since changing your oil filter, chances are it's clogged. Better put in a Purolator Micronic† Refill—fast! Takes only a few minutes. Costs as little as $1.60. *More car makers specify Purolator than any other make of filter.*

PurOlator

World's finest **OIL FILTER**

"You know, there's a Purolator engineered for every make of car," says Mr. Cossé, *"We recommend Purolators for all the cars we service."*

IT PAYS TO CHECK YOUR OIL FILTER EVERY TIME YOU CHANGE YOUR OIL

†Trade mark of Purolator Products, Inc., Rahway, N. J., Toronto, Canada. Reg. U. S. Pat. Off.

Copyrighted material

DREMEL ELECTRIC COPING SAW... THE FAMOUS ALL-FAMILY GIFT!

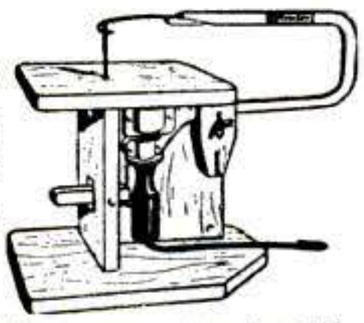
AMAZING FOOT-A-MINUTE
(17,200 Strokes Per Min.)
CUTTING SPEED!

ELECTRIC DREMEL POWER TOOLS

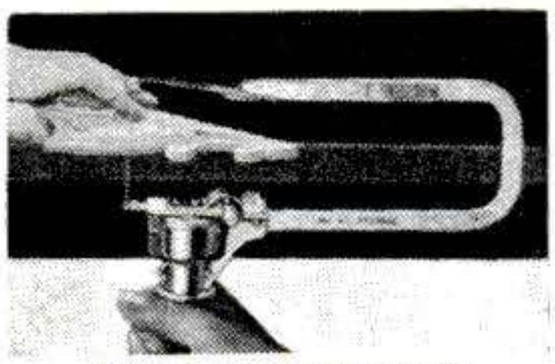
ONLY **$6.85** with 3 saw blades

FREE PROJECT PLANS

Make your own jig saw. Complete plans and six project patterns, included FREE.



Here is a high speed, electric power tool with hundreds of household and workshop uses! It's so easy to handle women and children love it, yet so rugged it is used by craftsmen, tile layers and carpenters. Has amazing capacity — easily cuts asphalt and rubber tile, masonite and formica, wood up to ¾" thick! Perfect for coping and jig saw work, making knick-knacks, toys, other hobby projects. Has high speed reciprocating motor, only two moving parts, never needs oiling. Proved on the job and in thousands of homes.

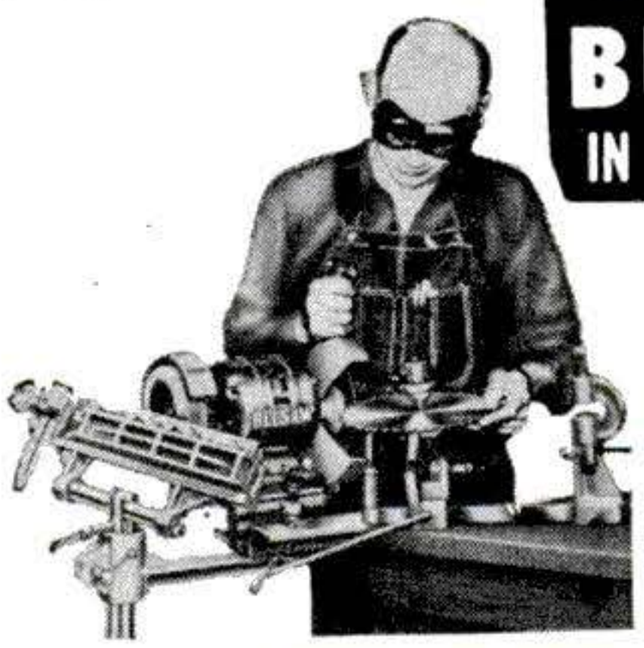


Cuts scrolls like magic!

SEE YOUR DEALER. If he cannot supply, order direct on 5-day trial, money-back guarantee. Remit in full for postpaid shipment; or send $2, pay postman balance plus postage and COD.

DREMEL MFG. CO. Dept. 124-F, Racine, Wis.

YOU CAN START A $40 A DAY BUSINESS IN YOUR SPARE TIME



Andy Phillips says: "My BELSAW Sharp Smith gives me big profits at low expense — I can run 35 to 40 circular saws in an 8-hour day — that makes me $40 cash."

"I also get BIG EXTRA PROFITS... up to $4 an hour.. by grinding planer and jointer knives — there's always a demand for this kind of work."

You can start this REPEAT CASH business in your own home or garage while you are working at your regular job. Easy to operate, no experience needed. "Pays for itself from just 65 jobs." — *Harvey Jensen*

For as little as $15 down payment, you can get your BELSAW SHARP SMITH rushed to you.

FREE book tells how

YOU can start making money the very day your BELSAW SHARP SMITH arrives. Earns $4 to $5 an hour in your SPARE TIME sharpening and setting circular saws for builders, lumber yards, factories...Plus BIG EXTRA CASH, precision grinding planer and jointer knives, plane irons, wood chisels and drill bits. Hundreds of jobs in your own neighborhood. No extra equipment needed, no canvassing. Send today for your Free copy of "Life-Time Security."

LIFE-TIME SECURITY WITH YOUR OWN BUSINESS

BELSAW MACHINERY CO
4407-A Field Building Kansas City 11, Mo.

What Makes the Earth Wobble

[Continued from page 262]

When the core goes slower than its mantle, the magnetic field at the surface also goes slower; in other words, it drops behind, or drifts west. As the core puts on speed to close the gap between itself and the outer part, the field drifts less.

The earth is two balls. It may be easier to grasp the idea if you think of the earth as a hollow ball with a much smaller ball inside. They are whirling at different speeds. A number of holes have been punched in the smaller ball, and a light at its center casts a pattern of dots on the inside surface of the big ball. This pattern doesn't stay at the same place because the two balls aren't moving at the same speed.

What could make the core turn at one rate, and us at a different one?

Radioactivity runs this engine. Scientists suppose that there's a heat engine at work, fed by radioactive fuel. Dr. Bullard has calculated that as little as one percent of the radioactive substances found in the surface rocks would be enough for the job. The heat sets up currents in the liquid core, and the irregular currents act sometimes as a drag, sometimes as an accelerator.

Nevertheless, the surface and the core remain pretty well hitched, and the irregular variations in the length of the day tend to cancel out. The answer seems to be that the turbulent core and the rest of the earth are electromagnetically coupled. The lines of force running between the molten metal and the solid outer part exert a braking action.

Rocks can conduct. How, some scientists asked, could sufficiently powerful electric forces pass back and forth to link the core and the outer part? Rocks are poor conductors. But Dr. Harry Hughes, an English physicist now at Harvard, and other researchers have shown that at the high temperatures inside the earth, rocks become good conductors.

What about the earth's wobble? Looking at his charts, Dr. Vestine answers that the westward drift of the magnetic

[Continued on page 266]

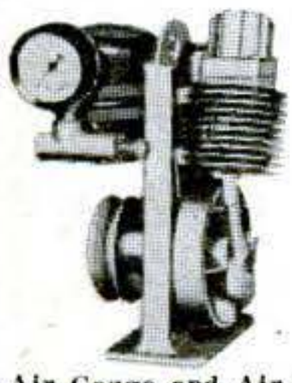
REMOVE Paint EASILY

WONDER-PASTE

makes a simple job out of removing tough paint, varnish, enamel, etc.... Softens up finish so it comes off easily—not coat by coat, but all in one scraping. Stays put on upright surfaces. Stays moist so you can work on large areas. Excellent indoors or out. At paint and hardware stores.

Write for Wonder-Paste leaflet—and advice on your removing problem.

Wilson-Imperial Company, 121 Chestnut St., Newark 5, N.J.



Paramount AIR COMPRESSOR

COMPARE *Price—Features—Savings!*

Reg. $24.95. Ball bearing, piston-type compressor of revolutionary new design. Can't be matched as an all-purpose, low cost unit. New principle operates it on conventional 1/4 HP—BUT delivers MORE air than ordinary 1/3 HP unit. **For professional paint spraying, tire inflating, insecticiding and hundreds other uses in shop, farm, home!** Delivers 2 1/4 cu. ft. air per minute. Includes Tank—Air Gauge and Air Regulator for adjusting pressure from 0 to 100 lbs. Order now and SAVE! **Satisfaction guaranteed or money back.** We pay postage. *Electrical Equipment Catalog on Request.*

$12.95 Prepaid

ROBERTS ELECTRIC CO., 849 W. Grand, Dept. 193, Chicago 22, Ill.

---

3 CU. FT. MIXER DIRECT FROM MFR. 39.75

Fills long felt need for small mixer for concrete, feed, fertilizer, seed and many other materials. Saves 3/4 cost of ready mixed concrete. Pays for itself on first job. Combination belt pulley and crank for hand operation. Also power mixers. Write for circular.

3 Cu. Ft. Drum—Mixes 2 Cu. Ft. Concrete $39.75
5 Cu. Ft. Drum—Mixes 3 Cu. Ft. Concrete 59.50

FOB Pulaski, N. Y. Cash, Check or M. O. Money back guarantee.

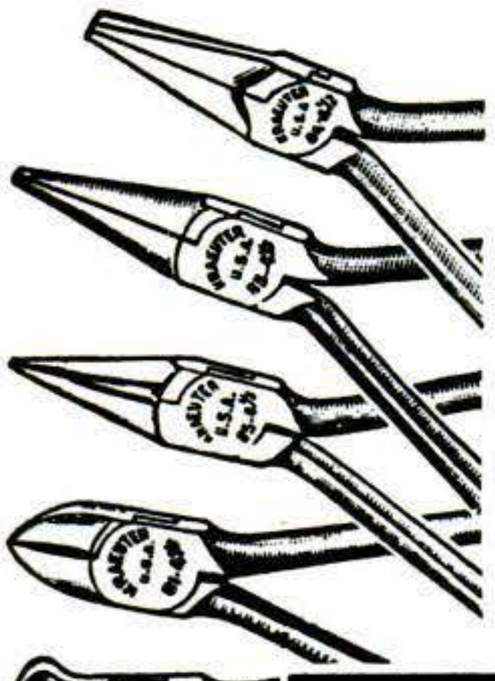
UNITED STATES FORGE AND FOUNDRY CO.
CONSTRUCTION EQUIPMENT DIV. PULASKI, NEW YORK

BRONZE FOUNDRY

Schools and Home Workshops

Make your own castings of aluminum, copper, bronze, silver. Foundry sets are available in three sizes including 2400 Deg. F. blast Furnaces, $22.50; $29.50; and $42.00 f.o.b. Kansas City. Free Circular.

KANSAS CITY SPECIALTIES CO. P. O. Box 6022, Dept. S-6 KANSAS CITY, MO.



PRECISION PLIERS

- *For accurate, exacting work use the fine, small pliers jewelers and watchmakers use — Kraeuter's Precision Pliers. Matched in size and handle shape, drop forged from selected tool steel, machined and heat treated to exacting specifications. For hobby crafters, model builders, TV and radio technicians.*

Buy wherever fine tools are sold in U. S. and Canada.

KRAEUTER

Start Spare Time Business
MAKE UP TO $10 an HOUR

Do-it-yourself on own house THEN EASILY SELL Neighbors & Friends

You Pay Only $6.65*
(buy glass & screen cloth locally)

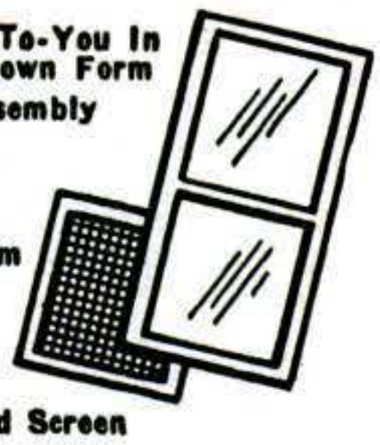
You Sell For $22.00

You Make Better Than 100% PROFIT

*28 1/2"x56" redwood window. Other sizes and aluminum slightly higher.

A Few Dealer Territories Still Available

Assemble and Install Buckeye Combination STORM WINDOWS



- Factory-To-You In Knock Down Form
- Easy Assembly
- Redwood or Aluminum
- Glass and Screen Interchangeable
- Each Size Packaged Seperately

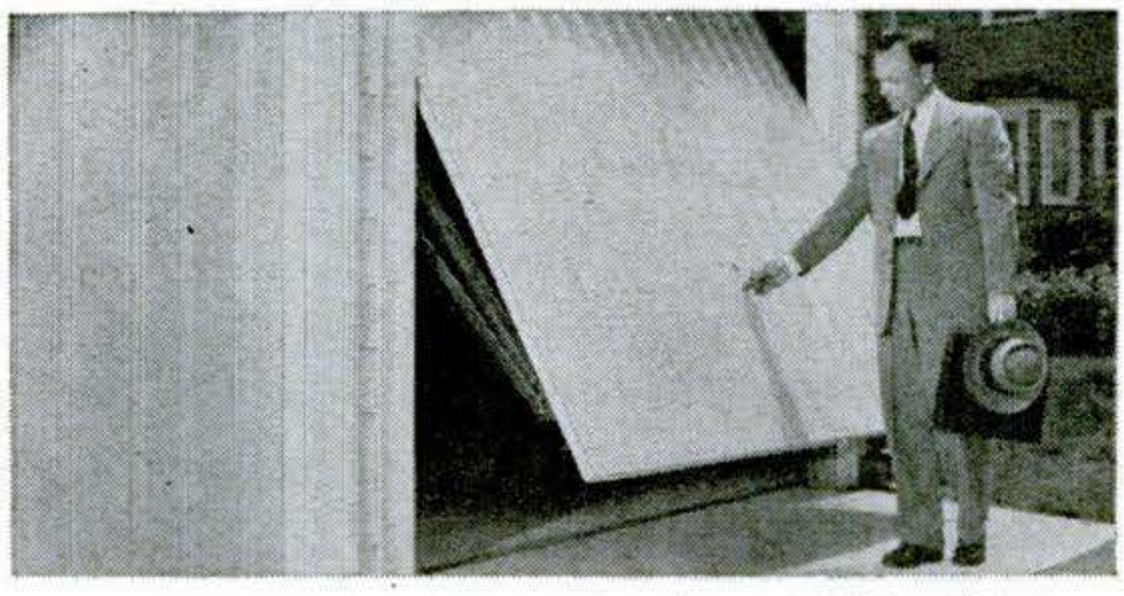
No get-rich-quick scheme. Sound legitimate business opportunity. No special tools to buy. No big inventory to buy. Order as needed. Thousands sold in past 20 years. Our reputation your guarantee of quality.

Can be FHA Financed

Added to any home for as little as $5.00 per month. No down payment. See your bank.

WRITE FOR DETAILS TODAY

BUCKEYE SCREEN & WEATHERSTRIP CO.
1378 S. 22nd Street, Columbus, Ohio



HOW TO GET A NEW GARAGE DOOR AT LESS THAN HALF PRICE!

Yes, you can have a swing-up garage door like the one shown here — complete with Stanley Swing-Up Hardware for *less than half* what you'd normally pay!

How? *Build it yourself* from Easi-Bild's* Pattern No. 86. It's easy! No special tools — no special skill! Just follow the clear, "can't-go-wrong" directions of the pattern. Tells you everything — including what materials to buy, where and when to use them. Stanley Garage Door Set is simplicity itself to install. You'll be amazed how quickly you can do the job — and mighty proud of your results.

Ask your dealer for Simplified Directions for Installing Stanley Garage Hardware and Easi-Bild Pattern. Or use coupon below. **Trade Mark Reg. U.S. Pat. Off. — Easi-Bild Pattern Co.*

EASI-BILD PATTERN CO., Dept. S-5, Pleasantville, N.Y.
Enclosed is 50¢ in coin, money order, check for Garage Door Pattern No. 86

Please send Simplified Directions for installing ( ) Single ( ) Double Garage Door Hardware.

NAME .....

ADDRESS .....

CITY ..... ZONE ..... STATE .....

Copyrighted material

SOCK—
without SHOCK

It's easy on you because the shock is absorbed by the resilient hickory handle . . . never hurts your arm.

You'll go faster. Blows fall with fullest force because the metal is *all* in the hammer head—scientifically balanced for easy speed.

It lasts a lifetime. The special analysis steel head and tough, second growth hickory handle withstand the hardest use.

That's why your Plumb Hammer lasts so long... and it won't wear you out.

Look For The RED Handle That Saves Your Arm

Quality Comes FIRST
PLUMB
Is FIRST In Quality

PLUMB®

HAMMERS • HATCHETS • AXES • FILES

What Makes the Earth Wobble

[Continued from page 264]

field is accompanied by an irregular northward motion of the field, near Indonesia. This points to a similar motion in the liquid core, with a southward motion on the opposite side of the core. The law of conservation of momentum then makes the North Pole shift.

Dynamo or thermocouple? Perhaps you've been wondering where the electric current that's responsible for the earth's magnetic field could come from. The geophysicists, who also have been wondering, now offer two explanations.

The so-called dynamo theory holds that weak magnetic fields occur anywhere in the universe where there is a large body of electrically conducting fluid—as there is in the core.

Given even a weak field, plus the turbulent motions of the core, and electricity is generated as in a dynamo.

The other main theory centers on thermoelectric forces. If you have two wires, and cool one and heat the other, you can generate electricity. Perhaps the molten core acts as one wire, and the cooler mantle of the earth the other.

Why the Pole wanders. Wherever the electric current comes from, its path in the molten, turbulent metal must be full of local eddies and dips. These would account for the variations in direction and strength of the magnetic field, as measured at the surface. They would also help explain why the north magnetic pole doesn't stay put.

But as yet there is no explanation for one puzzling fact. In the last hundred years, the force of the magnetic field, as measured at the earth's surface, has dropped by six percent. At that rate, not very many thousands of years from now, nobody will worry about variations in the magnetic compass: there won't be any magnetic compass. END

Thought for Today

I got to thinking the other day—you know, the way you do when the television is broken.—*Smithcraft Light.*

Copyrighted material

Easier Metal Repairs

FREE Illustrated Booklet, "Soldering Simplified." 16 pages of how-to-do-it! Get your copy.

Kester Solder Company
4254 Wrightwood Avenue, Chicago 39, Illinois

MAGNETS 225 lb. PULL

GENUINE ALNICO - NEVER WEAKENS

AMAZING, PERMANENT MAGNETS—WILL NOT WEAKEN! NON-ELECTRIC
Retrieve guns, tackle, tools and other steel items from lake, river, plating tanks, drains or other hard-to-reach spots. Recover drills, taps, etc. from sweepings. Clear alley of harmful tacks, nails. Many other uses. Pays for itself quickly. GUARANTEED. Try any magnet one week. Money refunded if you are not well pleased.

No. S-725 (Weighs 54 oz.) Has pull of 225 lbs. on steel block **$15.00**
No. S-675 (Weighs 49 oz.) Has pull of 175 lbs. on steel block **$10.50**
No. S-650 (Weighs 41 oz.) Has pull of 150 lbs. on steel block **$ 8.50**
No. S-500 (Weighs 15 oz.) Has pull of 50 lbs. on steel block **$ 4.00**
No. S- 30 Hobbyist assortment of six small magnets. . . . . **$ 1.50**

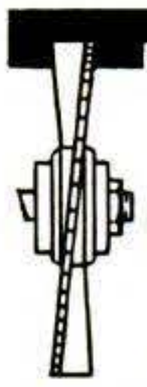
Send Money Order or check. We pay postage. No C.O.D.'s.

MIAMI MAGNET COMPANY, 3240 N.W. 27th Ave., Miami 42, Fla.

WHAT'S NEW ABOUT NEW SHOPSMITH®

Everything! It's even more accurate, more versatile, easier to operate! See it at your dealer's now. For big, new, free booklet with 20 pages of pictures, data, drop a card to:

SHOPSMITH, Dept. 262-A, 12819 Coit Rd., Cleveland 8, Ohio

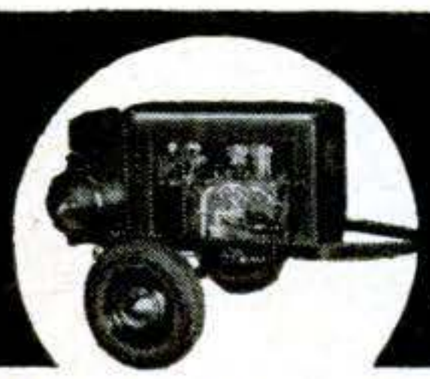


NEW WAY TO CUT PERFECT GROOVES WITH CIRCLE SAW!

Just dial any of 40 cuts. Parallel, clean, no sanding! Leave on saw for regular cuts. For ½, ⅝, ¾ and 1" arbors. At dealer's or order direct!
Send for free booklet

Only $4.95 per set

WARREN DADO WASHERS CO.
Dept. 46 P.O. Box 98, Detroit 2, Mich.



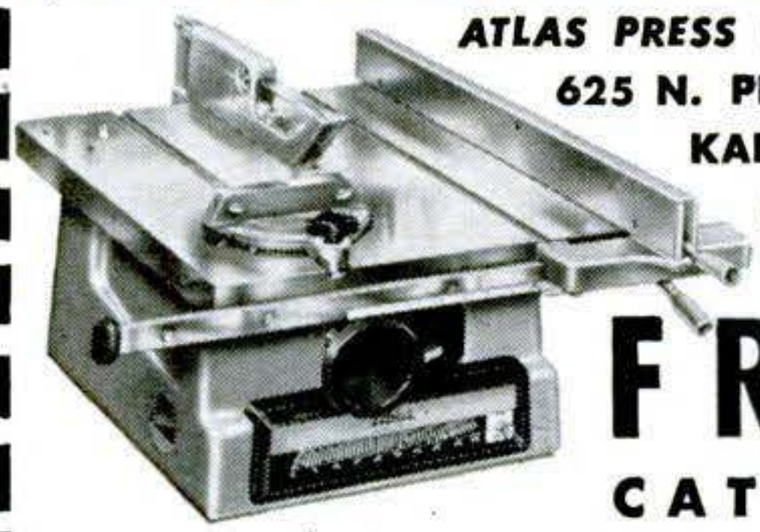
BUILD your own SMITH AIR COMPRESSOR

Operates spray guns, rock drills, tampers, paving breakers, sandblasting . . . Uses only 1 gallon of gas an hour!
Save Money—build your own Smith Air Compressor! Famous the world over! Cap. 60 cu. ft.; pressure up to 100 lbs. per sq. inch. Just order the Smith Compressor Head and Accessories with complete instructions for assembling. All you need is a Ford Motor and shop facilities. Head equipped with high speed compressor valves; automatic unloading and idling.

Write for complete information!

GORDON SMITH & COMPANY, Inc.
405 College Street • Bowling Green, Ky.

FIND OUT ABOUT AMERICA'S NEWEST AND FINEST 8" AND 10" TILT/ARBOR SAWS!



ATLAS PRESS COMPANY
625 N. PITCHER ST.
KALAMAZOO, MICHIGAN

FREE CATALOG

Please send me complete information about THE GREAT NEW ATLAS SAWS with the TEN ALL-NEW FEATURES that make them the fastest, smoothest, most accurate ever offered. I want to see for myself why they are being acclaimed by commercial users and hobbyists alike.

☐ Also send me the name of my nearest franchised ATLAS dealer.

NAME _____

ADDRESS _____

CITY _____ STATE _____

you can DO so much MORE so much BETTER with Atlas

The easy way to paint!

Speedy Sprayer

ONLY **$36.50** Less motor

Favorite of home owners and craftsmen for 20 years! SPEEDY SPRAYER gives your work that professional paint finish everyone admires. Sprays paint, enamel, varnish, lacquer, etc. . . . 4 to 7 times faster than hand brushing! Lightweight, portable, uses any ¼ H.P. motor. Improved diaphragm principle assures clean, oil-free air. You'll find dozens of time and money saving uses for SPEEDY SPRAYER, including spraying insecticides 2-4-D and DDT. Complete outfit, without motor, only $36.50

At leading hardware, lumber, and auto supply dealers.
FREE—*write for handy booklet "How to Spray."*

W. R. BROWN CORPORATION
2637 N. Normanay Ave. • Chicago 35, Ill.

Copyrighted material

Science Speeds Shaving With "Canned Lather"!

That's right! They've invented a gadget that makes shaving faster, easier, more pleasurable! Now you can get rich, creamy lather right out of a can . . . ready to use!

No brush to slow you down . . . no greasy cream to clog your razor. Just push valve . . . out comes lather! That's AERO SHAVE . . . the wonderful new "canned lather" that contains 3 beard-softeners to wilt toughest whiskers in a jiffy . . . *plus soothing lanolin to protect your skin against shaving irritation.*

Get AERO SHAVE Lather Bomb today . . . in the handy metal container with the turret top that won't leak when you travel.

Big Bargain! Aero Shave is the lowest priced "push-button" lather bomb on the market today!

USE "PUSH-BUTTON" LATHER

AERO SHAVE

Also economical King Size—12 oz. only 98¢

FREE BOOKLET

Your Guide to Speedy Accurate LEVELING

Send for your free copy of "ON THE LEVEL," a booklet that tells you how to handle every type of leveling job speedily, easily, accurately and economically with the new, amazing LEVELALL.

Learn how LEVELALL operates on the principle that "water seeks its own level." . . . how you can level points all alone . . . how easy it is to handle and use the transparent plastic tube, shut-off valves and mounting brackets . . . why LEVELALL is better and quicker than a transit . . . how LEVELALL pays for itself quickly by saving time and costs . . . and how satisfied customers praise this precision instrument.

Send for the booklet and get the facts . . . then you'll want a Deluxe LEVELALL . . . only $12.95. Better yet, take advantage of our money-back guarantee and order your LEVELALL now. Dealer inquiries welcome.

L E V E L A L L

LEVELALL, 81-F Webster St., Rockland, Mass.
☐Please send free booklet, "On the Level." ☐Mail me Deluxe LEVELALL @ $12.95 ☐Regular 50′ model at $9.95 ☐Ship postpaid full price enclosed. ☐Ship C.O.D.

Name_____

Street_____

City_____ Zone_____ State_____

The Other Fellow's Shop

[*Continued from page 180*]

it and be neutralized before they had time to eat away pistons, cylinder walls and bearings. After trying various methods for putting magnesium in contact with the crankcase oil he came up with a drain plug fitted with a rod of special magnesium-aluminum alloy. After installing one in his own car, he persuaded several fleet owners to try such plugs.

Finally, in 1949, Johns decided to put his magnesium-alloy drain plug on the market. Now its sales are about 12 times as great as those of his dowel maker and lathe tools.

Advice to Home Workshoppers

To other home workshoppers who dream of expanding their own hobbies into profitable businesses, Winthrop Johns offers some practical advice:

- "If you have an idea, test it out thoroughly before you risk any money trying to market it. Be sure there is a need for it and be sure you can make it at a price that will sell and still pay you off.
- "If you do hit on something that has appeal—and a market—don't rush out and expand your equipment and your space. Try to get along with what you have for a while.
- "Don't expect to get rich overnight. Brace yourself to the fact that perhaps for quite a time everything will be going out and very little will be coming in.
- "Above all, if you are married, make doubly sure that your wife is willing to go along with you on the idea or at least is willing to suffer and cooperate."

Although Johns has not invented a new kind of mousetrap, he has devised a new way to use a conventional mouse- or rat-trap. He nails it in a vertical position, bait down, to any wall, door jamb, or other convenient vertical surface about two inches off the floor. He says it works when traps placed on the floor won't, because the mouse or rat can't walk over the trap from the rear end and trip it without getting caught. END

Good Reason

"Why is Mr. Knight pacing up and down on his front porch?"

"He's awfully worried about his wife."

"Is that so? What's she got?"

"The family car."—*Pure Oil News.*

Only **HOLD-E-ZEE**
The Original AUTOMATIC GRIP
SCREWDRIVERS

PROVIDE THESE FEATURES:

- **LOK-BLOK** that makes blade twist and impact proof.
- **GRIPPER** that snaps back—recedes deep into handle, giving full blade use.
- **HAND GROUND BITS**—chrome vanadium, chrome plated blades.

YET COST NO MORE THAN ORDINARY SCREWDRIVERS

At Leading Dealers Everywhere!

UPSON BROS., INC., ROCHESTER 14, N. Y.

WELD **BRAZE** **SOLDER** **CUT**

4 WAY WELDER

ONLY **$14.75** f.o.b. factory

Complete with Twin Carbon Arc Torch and accessories . . . to handle all metal-craft work.

Acclaimed by thousands of Homeowners, Mechanics and Hobbyists as the welder of 1001 uses. Easily operated from properly wired 110 volt AC or DC line. The ideal gift with a life-long use....Order today on 10 day money back guarantee.

FOUR-WAY WELDER CO., Dept. F3-F
1810 S. Federal St. • Chicago 16, Ill.

MAKE *MORE* MONEY!

Dealers or Representatives Needed for nationally advertised line of Spark Plugs — Oil Filters — Auto Specialties — Liberal Proposition — Full or Part Time — Experience Not Necessary — Write Today

ENGINE PRODUCTS MFG. CO.
5801 E. Beverly Blvd., Dept. 185, Los Angeles 22, Calif.

MAKE YOUR OWN FOUNTAINS, LAKES, RIVERS, WINDOW DISPLAYS

Get real live action with miniature water pump. Only 4¾" high — 3¼" wide. Threaded for pipe or uses ⅜" rubber tubing. Sturdy rustproof alloy metal — mounted on rubber. 110 A.C. — 60 cycle. 1/250 H.P. Pumps 50 gal. per hr. Complete — ready to work. Immediate money back guarantee. Send check or M.O. Or send C.O.D., you pay postage. Dealers wanted.

$9.95 IN U.S.

MOORE MANUFACTURING CO.
SWEDESBORO 16 NEW JERSEY

CUT COSTS with ALLEN Punch Press

$97.50 Less Motor

Free Circular

1-Ton Power Bench Type

Powerful, Dependable, Economical

For light work—stamping, forming, riveting, etc.—Metal, fiber or other material.

Overall height 17½" . . . Base size 8½"x8½" . . . Die bed 5½" x8½" . . . Ram face 1½"x3½" Ram stroke ¾" . . . Positive ¾" ram adjustment . . . Sturdy, single pin, non-repeat hand lever clutch. V-belt drive. Weight 105 lbs. . . . . Requires only ¼ to ½ H.P. Motor.

The machine of a thousand uses! Adequate for many types of work now done on larger presses at greater expense.

30-Day Money-Back Guarantee
Order TODAY. Price $97.50 F.O.B., Clinton, Mo. (Includes Motor bracket, V-belt, Motor pulley, less motor.)

ALVA F. ALLEN Dept. PS CLINTON, MO.

HOW TO STOP VALVE TROUBLES

by DUANE CARTER
International Racing Champion

I race for a living . . . depend on a smooth-running engine for my bread and butter. That's why I use Miracle Power in the gas and oil of my racers—and private car, too. You see, heat in upper cylinder areas, even in passenger cars, often reaches 1400° F.—over twice the temperature at which oil burns off! So you can't count on oil to lubricate valves and lifters. But Miracle Power is not affected by extreme temperatures. It keeps valves free and lubricates when heat breaks oil down. And Miracle Power prevents Dry Starting Damage—cause of most engine wear, because oil can't reach all parts right after starting. But a light, tough film of Miracle Power is *always* there preventing dry metal to metal contact.

An independent laboratory reports Miracle Power means more power, longer engine life and less oil consumption—just what I've found in *my* experience. Get this free report from The AP Parts Corporation, Dept. 812, Toledo, Ohio. And start using Miracle Power in your gas and oil today. It will pay off for you, as for me!

★ ★ ★

Miracle Power, a blend of super lubricants, including colloidal synthetic graphite in suspension, *treats the engine, not the oil.* 85c size for use in gas and oil every 1000 miles and 39c size for top cylinder lubricant between treatments. (Slightly more in Canada.) Money back guarantee at car dealers, garages, gas stations. Approved by Ford, Kaiser and Willys for sale through their dealers.

© AP Parts Corp., 1954

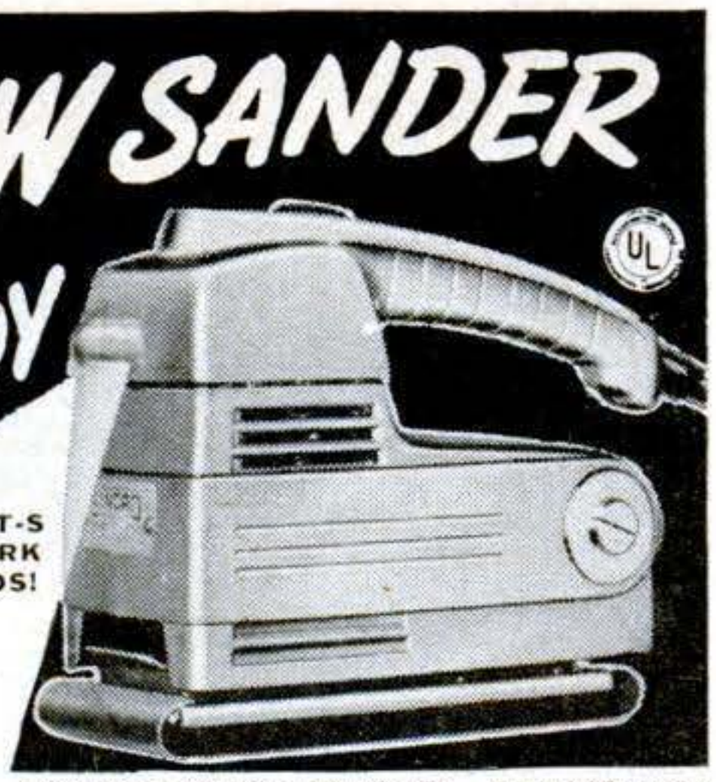
SEND FOR *FREE* CATALOG

Money-Making Tools!

It's easy to own the same "pay-off" tools used and endorsed by America's top-earning mechanics! You can start building your own kit with basic Snap-on sets—add others any time. Never sold in stores—direct to users only. Send today for free catalog!

Snap-on Tools Corporation
8060-F 28th Ave., Kenosha, Wis.

Copyrighted material



Only $39.95

L-I-G-H-T-S YOUR WORK AS IT SANDS!

The ONLY Portable with ALL These Features!

Standard Model: 60 Cycle, 110-120 volt A.C. Other cycles, voltages available.

(1) Motor guaranteed against burn-out during ownership or replaced free. (2) Removes more material with less upkeep than any other sander at any price. (3) Over 1000 hours of continuous sanding without breakdown in laboratory endurance trial. (4) Work-Light standard equipment—a Syncro "first" for portable sanders of its type. (5) Vibration-absorbing handle floats in rubber (Pat. Pend.). (6) Easy to use, hand operated, positive paper holding clamps. (7) One hand operation—no jumpy, twisty torque to fight. (8) Most powerful reciprocating sander motor (Patented). (9) No oiling—power unit floats in rubber—no cams, bushings, belts or gears to wear out.

HEAVY DUTY SYNCRO NEW '900' SANDER

USE COUPON

SYNCRO CORPORATION, DEPT. 2-A4, OXFORD, MICHIGAN

☐ **TRIAL ORDER:** I enclose $39.95. Send postpaid New No. '900' Sander with accessories . . . on 10 Day Money Back Trial Offer.

☐ **C. O. D. ORDER:** I enclose $5. Send '900' C.O.D. I will pay balance ($34.95) plus postage, C.O.D. fee, on arrival. Same 10 Day Money Back Trial.

☐ **FREE FACTS:** Send for new free Syncro Sanders Circular, Free "How to Sand" booklet.

Name.....

St. and No. .....

City.....Zone.....State.....

Dealer's Name, Address.....

WOODCRAFTSMEN'S

144 page **ENCYCLOPEDIA** **15¢**

Bargain book of every conceivable woodworking item and tools. Full of How-To-Do-It information, illustrations, projects and ideas. Domestic and imported woods, inlays, panels, etc. Send for your copy today. Biggest 15c worth ever offered.

CRAFTSMAN WOOD SERVICE CO.

• Dept. B6, 2729 S. Mary Street, Chicago 8, Illinois

FREE BOOK —"How to Do a Good Paint Job." Send card (and name of your retailer, if you wish) to Baker Brush Co., Inc., 83 Grand St., New York City 13

Brushes by Baker

AMERICA'S FINEST PAINTING TOOLS

Music Warms Mechanical Brain

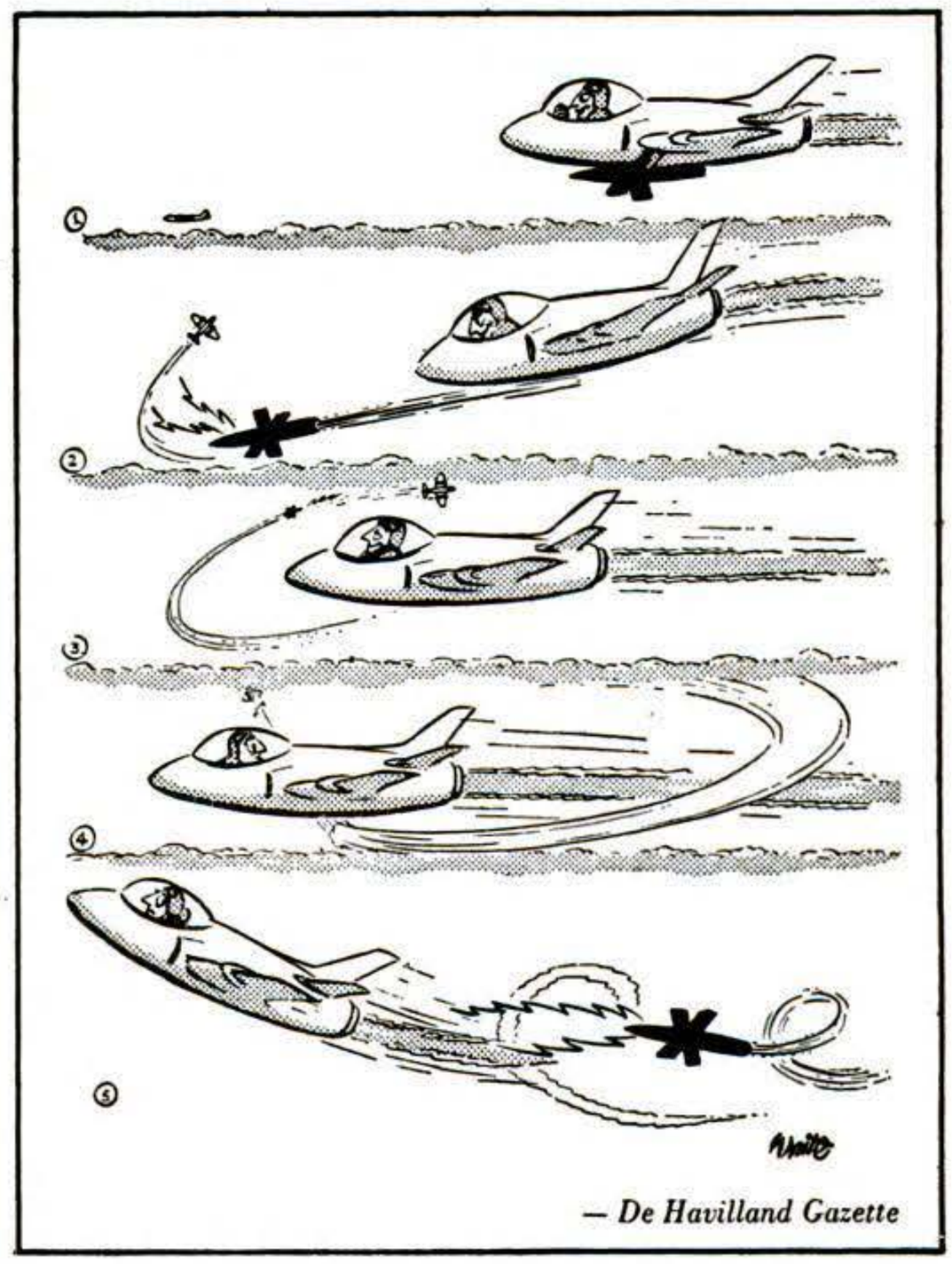
A CONCERT warms up the big electronic computer at the National Bureau of Standards in Washington. Its operators feed it problems that generate the tones for such favorites as "Dixie," "America," and "K-K-K-Katy."

By giving the machine instructions that force it to delay a certain time, say 1/500 second, between each of its computations on a problem, a note that corresponds to 500 cycles per second, or about C above middle C on a piano keyboard, can be forced from the computer.

Different notes can be played by varying the time delay introduced in working out the problems.

A spare-time contest between two of the machine's masters resulted in the perfection of the musical performances. Frank Stockmal won first musical honors by performing "Dixie," even though he comes from New Haven, Conn. Then he programed "K-K-K-Katy" and, later, rendered "America."

Since the machine has a range of only about two octaves, its possible repertoire is quite limited. Other songs known to have been programed on other computers are "God Save the King" and "Auld Lang Syne."



— *De Havilland Gazette*

Copyrighted material

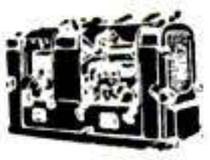
GIGANTIC SAVE-TO-70% **MAIL SALE** WAR SURPLUS EXCESS INVENTORY BANKRUPT STOCK

All items in this ad sent PREPAID, except Searchlight!

AIR COMPRESSOR ITEMS

- Finest piston 100-lb. compressor. 3 c.f.m. Build your own air system. Special..... **$19.95**
- Also tanks, regulators, etc. at big savings. Send for data.

DELUXE POWER PLANT



- Marvelous 3000-4000-w. 115-v. 60-c plant. Army's finest. 4-cyl. water cooled engine, fully standard. Govt. cost over $800. Spl. **$349.50**
- **115/230-v trans.**.....$19 extra.

Many other plants and generators on sale.

BROAD SWATH WEED SPRAYER

- Leading make guar. multi-jet unit. Sprays 41'. Complete with finest bronze gear pump, hose, barrel mtg., valves, etc. $150 value. Special **$77.95**

Many other buys in weed spray units.

POWER SPRAYER

For farms, estates, orchards.

- Clinton engine-pump on 50-gal. tank with agitator, 50' hose, hand boom, etc. List $225. **SPECIAL**. . . **$114.50**

3 H.P. G.E. MOTOR

- Genuine brand new Capacitor start General Electric 3 H.P. 115-volt 60-c single phase farm utility motor. Ideal for saws, elevators, pumps, etc. Guaranteed. List $224.50. **SALE** **$121.90**

SPECIAL Of The Month!

New DeLuxe Army

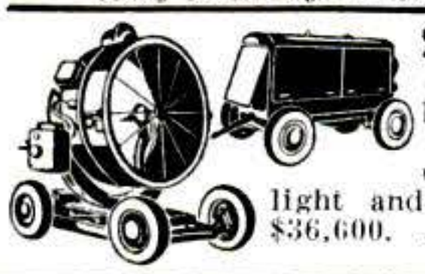
TOOL CHEST

28"x38"x12"

- Wonderful attractive unit. Finest wood cabinet design. Four lift-out drawers, excellent hardware, etc Heavy and durable.
- Ideal for home shops, contractors, tool rooms, etc. Govt. cost. $59.60. **SALE** **$21.95**

SUPER CLOSEOUT BARGAINS

- **Army Hip Boots** (10, 11 or 12).....$7.89
- **Giant Flood Light** (see May ad).....$49.50
- **Army Parts Cleaner**.....$29.50
- **Welder and Torch**, HC, 100 amps.....$58.60
- **Generator** (200 amp DC) 115-v AC....$29.48
- **Centrifugal Pump** (100 gpm).....$29.50



$50 NIGHTLY RENTING WORLD'S LARGEST LIGHT!

- Make real money nights renting Army 20-mi. beam searchlight to stores, fairs, night ball games, etc.
- We have only 10 of these spectacular units. Service easy to sell. Get back investment 60 days. Govt. cost, light and plant, $36,600. ..... **SALE, $1,595** FOB, Lincoln

Write for full details.

Hundreds of surplus buys: Hydraulics, Pumps, Binoculars, Surveyors Levels, Electronic, etc.

We pay shipping charges. Send for catalog.

BURDEN SALES COMPANY

828 "O" St. LINCOLN, NEBR.

All the Facts You Need About PORTABLE ELECTRIC TOOLS!

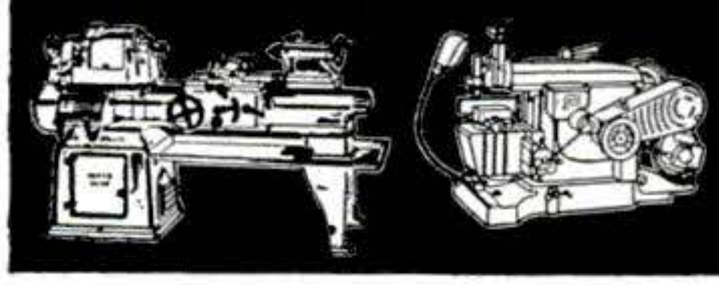
New **CATALOG!** Hundreds of time and money-saving ideas for hobbyists, builders, professional woodworkers! New 28-page catalog describes latest portable electric tools—how they work—what they do—where they save. Explains features and uses of electric saws, belt sanders, orbital sanders, disc grinder-sander-polisher, routers, planes, shapers, drills, bench grinders, chain saws, hedge trimmers—tool accessories Shows what to look for when buying electric tools—how to get most value. Write today Send 10c to cover postage and handling. **Send for your copy NOW!**

PORTER-CABLE MACHINE CO., 2686 N. Salina St., Syracuse 8, N. Y.

SEND ONLY $1

for next 6 issues of famous DELTAGRAM, best home woodworking magazine you ever saw. Packed with shop-tested ideas—12 to 15 in *each* issue. Send $1 (no stamps) to: Delta Power Tool Division, Rockwell Mfg. Co. 504F N. Lexington Ave., Pittsburgh 8, Pennsylvania.

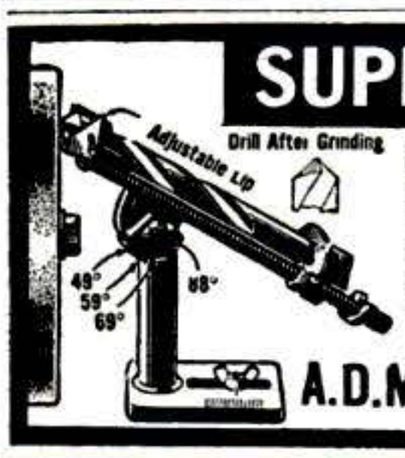
SOUTH BEND LATHES • SHAPERS DRILL PRESSES



Send for catalog on Lathes (9" to 16-24"), Shapers or Drill Presses.

SOUTH BEND LATHE
South Bend, Ind.

SUPER DRILL GRINDER



Sharpens round shank drills from 3/32" to ½" in diameter, up to 6" long. Grinds old drills like new in 4 different point angles, using hand or power grinding wheels. Money-back guarantee, only **$2.95**

At Dealers or Postpaid

A.D.McBURNEY 5908 Hollywood Blvd., Dept. S-42, Hollywood 28, Calif.

NEW! Every Electric Drill A Powerful PORTABLE JIG SAW

"ARCO JIG-SAW"

HAS SAME CAPACITY, CUTS AS FAST AS SAWS COSTING $50 & UP!

Does work of Jig, Keyhole, Coping, Band, Rip, Hacksaw.

HAS EXCLUSIVE, BUILT-IN AIR BLOWER.

Here for the first time is a Portable Jig Saw that attaches in ONE MINUTE to any ¼" electric drill. It will handle any project from the smallest to the largest, cuts openings without a **starting hole.** Cuts intricate patterns in wood, plastics, metals.

"ARCO JIG SAW" is a powerful tool that is easy to handle because of its **Right Angle Drive, Safety-Yoke & Worm Drive Clamp** make it a vibration-free unit.

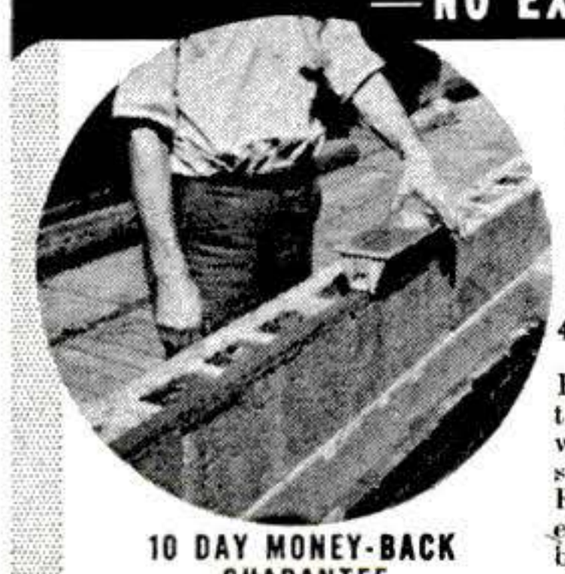
No. 505—Six extra Blades for wood, metals, etc.....**$1.95**

BUY THE BEST—see your hardware dealer now! If not available, try "ARCO JIG-SAW" on our **10-DAY MONEY BACK GUARANTEE.** Send us check or M.O. (Postpaid). C.O.D.'s—postage extra.

ARROW METAL PRODUCTS CO.

Dept. PS-6, 140 WEST BROADWAY, NEW YORK 13, N.Y.

LAY YOUR OWN CEMENT BLOCK WALLS —NO EXPERIENCE NEEDED



10 DAY MONEY-BACK GUARANTEE

Amazing - New "Do-It-Yourself Tool"

KAKEST MORTAR PLANE*

4 TIMES FASTER THAN TROWEL

Revolutionary new Mason's Tool saves time and money on any masonry block wall project. Lays absolutely uniform, smooth ribbon of mortar. No guesswork. Every course comes out true and level—eliminates waste of mortar—easy to use by amateurs.

*Registered U. S. Patent Office

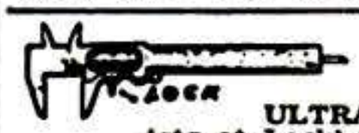
ORDER TO-DAY

Dept. No. 3 **KAKEST CO.** CURWENSVILLE, PENNA.

Copyrighted material

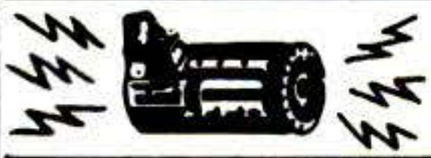
WAR SURPLUS AND OTHER BARGAINS SAVE UP TO 90%

MICROMETERS Chrome plated, precision engineered, carefully tooled to give long life. All new 0-1" cap. $2.25 ea., 1-2" cap. $3.50.



"HELIOS" ORIGINAL TOOLMAKERS VERNIER CALIPERS

ULTRAPRECISION — Imported. Used by machinists at Lockheed, Douglas, Bendix, GM, RCA, GE. Model 51/2E. Genuine Helios. Hardened lapped precision surfaces. 1/1000" and 1/128" graduations. Handy slide roll and thumb lock. Quick, accurate depth. A $35 value. Satin finish. ALL NEW, just $6.50. Leather carrying case, $1 extra.



NEW P1 GENERATORS

Electric Auto-Lite. 200 Amps. 24 Volt. 2500 RPM. Dandy arc welder. Wt. 53 lbs. Approx. Govt. Cost $450. NEW. $17.50 incl. easy to follow diagram.

SPECIAL CARBON PILE TYPE VOLTAGE REGULATOR Helps maintain constant current and prevents pulsation. Ideal for installation with above Generator for lighting plant. Wt. 2½ lbs. NEW. Approx. Govt. cost $90. NOW ONLY $4.95 POSTPAID!

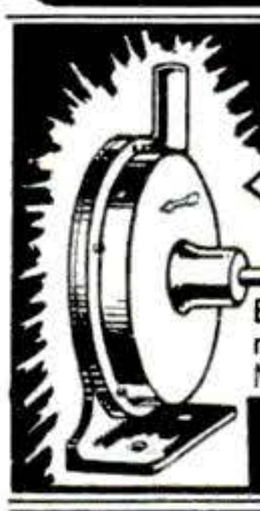
SENSITIVE ALTIMETER in 10 Ft. Increments. NEW! Famous Pioneer! 0 to 35,000 ft. (inches of Mercury). Tested and inspected in our own instrument lab. Guaranteed perfect. Approx. Govt. Cost $150. NOW ONLY $12.95 PREPAID!

AIRESEARCH LINEAR ACTUATOR

Open and close garage doors, remote control of industrial machines, marine use, displays, etc. Motor drives actuator in a 6½" travel through a reduction gear box. Wealth of gears. 24 Volt, 11 Amps, 1750 lb. lift. Wt. 8½ lbs. Approx. GOVT. COST $250. While they last — $5.95.

Send 25¢ for big catalog. Bargains for everyone. Check, Money Order or Cash. 25% deposit on C.O.D. orders. Prices F.O.B. Culver City, Calif., Unless otherwise stated.

AIRBORNE SALES CO., INC. DEPT. PS654
8501 Stellar Drive, Culver City, Calif.



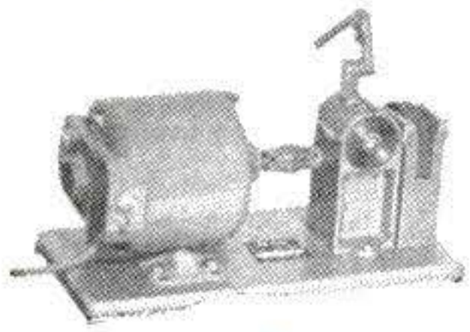
PUMP WATER FAST!

DRAIN WASH TUBS, CELLARS, CISTERNS
IRRIGATE—FILL TANKS—DRAW WELL WATER

Pumps 2800 GPH. 420 GPH at 75' High or 1600 GPH from 25' well. Sturdy, Rustproof Alloy Metal. Six Blade Impeller. Uses any 1/8 to 1/2 H P Motor Will not leak or clog Fits any garden hose. Immediate Money Back Guarantee. Send Check, M O, or C.O D. 8.95 IN U S

MOORE MANUFACTURING CO.
SWEDESBORO 2 NEW JERSEY

AMAZING NEW INVENTION



can earn you $20 an HOUR in spare time!!

Own a profitable business for just $98.50

Be your own boss—work as much or as little as you like —yet earn up to $100 for just one day's work. Anyplace that serves food is a prospect for KNIFE SERRATING. You do expert "on-the-spot" sharpening and serrating with the amazing portable "Saw-Keen" KNIFE SERRATOR. Get back your investment in a few hours.

NO COMPETITION—NO DELIVERIES TO MAKE —NO STOCK TO CARRY. Now's the time to start getting BIG PROFITS in your own business!!

Write for the full story—no obligation to:

CUTTER-CRAFT MFG. CO. 1000 E. GREEN ST. PASADENA, CALIF.

Wonder Drugs Change Farming

THE magic bug killers—penicillin, streptomycin, Terramycin, Aureomycin and others—are famous for the human lives they save. But some scientists think that the wonder drugs will find even more revolutionary uses in farming.

Antibiotics are widely used in animal feeds. About 13 percent of the total 1952 antibiotic production was fed to animals to make them grow bigger faster. Experiments are continuing in many research laboratories to determine exactly why antibiotics stimulate growth.

Drugs Combat Plant Diseases

The use of the wonder drugs to control plant diseases is the latest of the agricultural uses. Halo blight of beans and fire blight of apple and pear trees will be conquered by antibiotic sprays if extensive field tests bear out earlier results.

Fire blight is considered the worst single disease of fruit trees. In some areas it has eliminated pear growing and seriously limited the varieties of apples that may be grown. Research on fire-blight control with antibiotics has been successful in widely separated centers. Dr. Robert Goodman of the University of Missouri, Dr. P. A. Ark of the University of California Experiment Station, and the Ohio Agricultural Experiment Station have reported success in using streptomycin and Terramycin against fire blight in apples. Dr. J. C. Dunegan of the U. S. Department of Agriculture was also successful in controlling fire blight of pear trees in a small-scale field experiment in California. This year Pfizer and Co., a large antibiotic manufacturing firm, will distribute Agrimycin, a commercial mixture of streptomycin and Terramycin, for testing against fire blight on at least 100,000 apple and pear trees.

Affects Bean Plants Systemically

Work with halo blight of beans has centered at the Beltsville, Md., station of the Department of Agriculture. There Drs. John W. Mitchell and William J. Zaumeyer have found that streptomycin spray will control the disease. Among the important results of this research is evidence that streptomycin acts systemically in bean plants. This means the antibiotic gets into the plant's circulation system and is carried to the points of infection. END

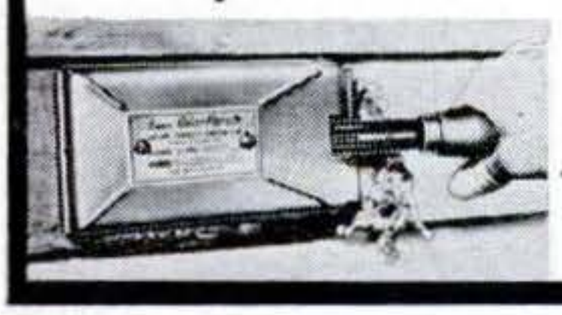
Copyrighted material

DO IT YOURSELF

Remove paint fast, easily, safely from houses, woodwork, boats with the **BRAND NEW**

LUDLOW ELECTRIC PAINT REMOVER

Super Glo-Torch

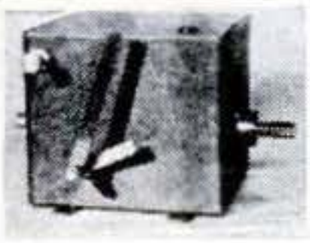


with G.E. Calrod 1000 watt, 115 volt AC-DC tubular heating unit!

ANYONE CAN OPERATE IT! **$10.95**

LUDLOW PRODUCTS CORPORATION
1416 Broadway, Schenectady 6, N. Y.

VARIABLE SPEED *HYDRAULIC POWER TRANSMISSION*



It has Infinite Speeds 0 to 550 Reverse Automatic Overload Protection: Adjustable Torque up to 180 inch pounds, 5/8" Input and Output Shafts. It will handle 1/4 to 1 1/2 H.P. Motor. Case measures 7 1/2" long 7" high 6 1/2" wide. VALUE OVER $300. Shipping Wt. 25#. On C.O.D. Orders we require a 10% Deposit.

only **$54.50** Fob. Chicago

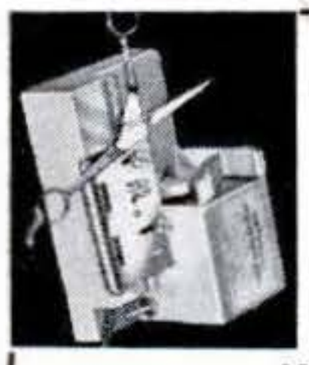
DIRZUIS MACHINE SHOP "O" 1423-25 52nd Ave., Cicero 50, Ill.

GOLD-SILVER-COINS

Easily located with new Lightweight M-Scope Detector. Superior performance, lowest price, monthly payment plan.

FREE LITERATURE

FISHER RESEARCH LAB., INC.
PALO ALTO CALIF.



Amendola gauge and el. grinder, and suspensory bandage

Sharpen shears and so forth, for barbers and useful at your home **$13.95.**

Ideal for factories. Larger **$18.95** Postpaid. C.O.D. slightly higher.

For support and comfort, size medium and large **$1.50.**

AMENDOLA MANUFACTURING CO.
1408-50th St. Kenosha, Wisc.

TRANSFORMER WELDER $19.95 FOB QUINCY

Complete with everything. Ready to plug in. 110 volts AC. 15-30 Amps. 3 heats. Welds metal from 1/16" to 1/4" using 1/16" to 3/32" standard rods. Guaranteed unconditionally. 10-day trial. No C.O.D. Does everything welders costing up to $75.00 do. Buy direct and save.

ESSAY MFG. CO., INC., Dept. 47, Quincy 69, Mass.

AT ALL HARDWARE STORES

FULLER'S "SCREW HOLDER"

SCREW DRIVERS

NOW! do the job at HALF THE COST!

- Spring Clip holds and sets screws tightly!
- Reaches those "out of the way" spots!
- In 3 1/2", 4 1/4", 6" and 8" lengths — also 4" Phillips type!
- Hi Carbon Blades! • Unbreakable Amber Handles!

ONLY **30c** (3 1/2"x1/8" blade)

FULLER TOOL CO., Inc. 3522 Webster Ave., N. Y. 67
Export Sales Dept., John H. Graham Co., 105 Duane St. • New York, U. S. A.

FREE PLANS

Build your own

CAR PORT-PATIO

EASY TO USE *Alsynite*®

Alsynite is shatterproof, feather-light, can be sawed and nailed. Perfect for awnings, fences, partitions, luminous ceilings, etc. 19 colors Send coupon today!

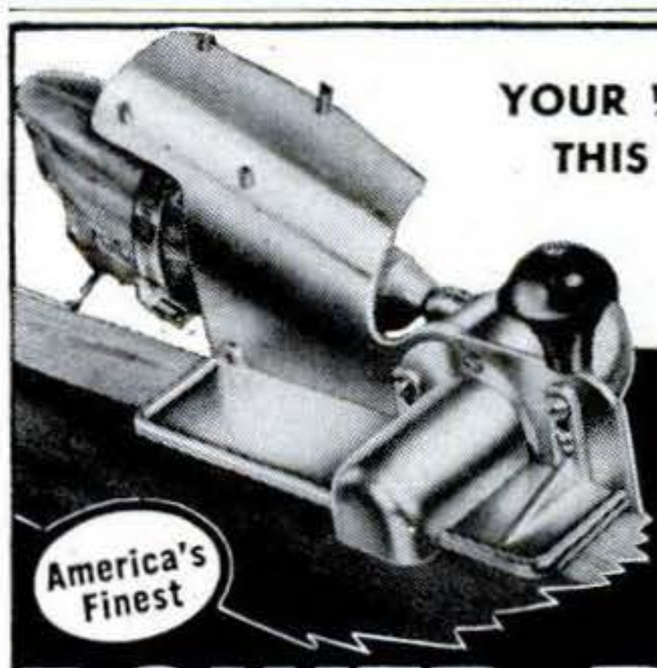
ALSYNITE COMPANY OF AMERICA
Dept. PS-A 4654 De Soto St., San Diego 9, Calif.

Send free plan for building → ☐ CAR PORT ☐ PATIO

NAME _____

ADDRESS _____

CITY _____ ZONE ____ STATE _____



YOUR 1/4" DRILL POWERS THIS NEW, IMPROVED WOOD PLANER ATTACHMENT

NEW! *Aladdin*

America's Finest

POWER PLANER

SAVES TIME AND WORK ON MANY JOBS

IMPROVED DESIGN—nothing like it at near the price. Saves time and work—planes accurately any wood, plywood or hardboard. Use on dozens of jobs—doors, screens, storm windows, cabinet work, etc.

EXCLUSIVE ATTACHING FEATURE—stainless steel clamp strap and four adjustable aligning screws hold planer and drill firmly together. Gives same "feel" as jack plane—many times faster. Change on or off in a jiffy.

Extra tough, heat-treated spiral rotary cutter, 2" wide with adjustable cutting depth from 0" to 1/4". Strong but lightweight die-cast alloy frame. Gears sealed in lubricant. Gears and cutter enclosed for safety. The perfect tool for handyman, amateur builder, home work shop.

SATISFACTION GUARANTEED OR MONEY BACK. See your dealer or order direct. Complete, ready to be clamped to your drill . . . On CODs, postage and fees extra. Literature gives complete description.

SANDING ATTACHMENT for planer & 2 Sanding Drums $1.00 Extra.

$12.95 POSTPAID *Order Today*

ALADDIN MFG. CO. DEPT. PS-1, 3125 HARRISON KANSAS CITY, MISSOURI

Copyrighted material

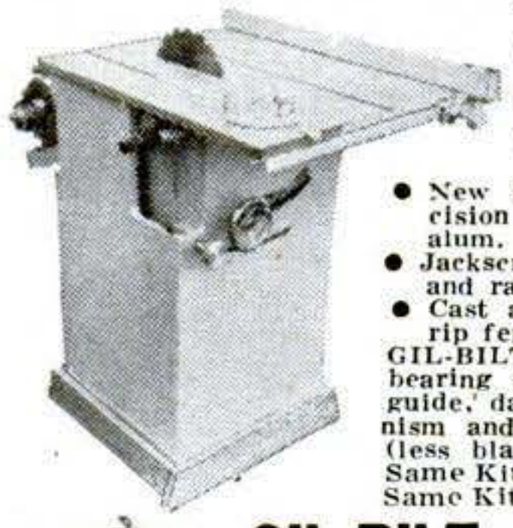
BUILD YOUR OWN POWER TOOLS - WITH GIL-BILT PARTS KITS

PLANS only $1.00 EACH POSTPAID

Exclusive GIL-BILT Build-It-Yourself Features

- No machining—build easily with hand tools only
- No blueprint reading—step-by-step pictorial plans, full scale patterns, actual photographs
- Sturdy wood, aluminum and steel construction
- Capacity and performance of commercial saws selling for $60 and up
- Proved performance. Nationally advertised and sold for 7 years. Satisfied customers around the world.

GIL-BILT 10-in. TILT/ARBOR SAW



- 27x28 in. table, 13½ in. capacity in front of blade
- 10 in. blade cuts 3¼ in. deep, tilts full 45 degrees
- Floor model 34" high, table always stays level
- New Departure ball bearing arbor, ¾" precision shaft turned down for ⅝" bore blades, alum. housing, shipped ready to run.
- Jackscrew and 4½ in. dia. handwheel lowers and raises blade
- Cast aluminum miter gauge and self-aligning rip fence guide.

GIL-BILT Metal Parts Kit includes Plans, ball bearing arbor, miter gauge and bar, rip fence guide, dado insert, lock knobs, jackscrew mechanism and handwheel, and all other metal parts (less blade).....$22.95
Same Kit with 10" Combination Blade $25.90
Same Kit with 8" Combination Blade $24.90

GIL-BILT 12-INCH BAND SAW

- Cuts to center of 24 inch circle
- Handles stock up to 6 inches thick
- 18x18 inch table tilts 45 degrees
- Lower wheel and drive pulley runs on sealed New Departure Ball Bearings; Upper wheel runs on two ⅝" bore Oilite Bronze bearings
- Upper wheel tension and tilt mechanism of cast aluminum, completely assembled
- Upper and lower blade guides. Each has ball thrust bearing, self-lub bronze jaws
- Rigid cast aluminum wheels fully machined ready-to-install. Heavy rubber tires
- Uses standard 78 inch blades up to ⅜ in. wide
- Fully enclosed mechanism for utmost safety

GIL-BILT Metal Parts Kit includes Plans, rubber tires, aluminum wheels, 14 in. blade, ball bearing spindle, tilt mechanism, blade guides, table tilt segments, and all other metal parts.....$23.95

ALSO AVAILABLE Plans & Parts Kits for 18-in. Band Saw, Belt Sander, Spindle Shaper, 8-in. Tilt-Table Saw

Return Kits in 10 days for refund if not satisfied. *For shipments up to 600 miles, add 5%; over 600 add 10%. Amount in excess of actual postage will be refunded.* Order Kit now, or order Plans at $1.00 each and Kit later less cost of plans. Write for **FREE** Catalog.

GILLIOM POWER TOOLS P. O. Box 1-VF, Lambert Field St. Louis 21, Missouri

NEW! Giant 1954 Catalog of AUTO PARTS AND Accessories

World's Largest Selection— 50,000 Items at WHOLESALE PRICES!

YOU SAVE UP TO 50%

148 Pages packed with items like these... all at Wholesale Prices! Auto radios — Mufflers, pipes—Engines, parts—Transmissions — Tires, tubes—Tools—Springs, shocks — Ignition parts

Ready now... **complete automotive buying guide**... everything for your car, truck, custom-styled car, or hot rod... all at rock-bottom **wholesale prices! Hard-to-find** equipment, parts for cars from 1920 to 1954 models! New HOLLYWOOD ACCESSORIES; HIGH-SPEED PARTS; CUSTOM-STYLING EQUIPMENT!

FREE ...valuable Check Chart showing how you can know if your car is safe—sent free if you mail coupon for catalog TODAY with 25c to help pay postage and handling. We credit the 25c on your first $5-or-more order, so Catalog will then be FREE TO YOU. Fill in and mail Coupon NOW!

J. C. WHITNEY & CO., 1917 T-6 Archer Ave., Chicago 16, Ill.

J. C. WHITNEY & CO.
1917 T-6 Archer Ave., Chicago 16, Ill.
Rush giant 1954 Catalog of auto parts and accessories at wholesale prices. I enclose 25c to cover part of cost, which will be credited to me on my first $5.00-or-more order.

Name.....
Address.....
City.....*State*.....

Sea Slugs Shipped by Air for Study of Their Colors

LIVE sea slugs—"flowers of the sea"—are being flown to the Smithsonian Institution in Washington so that scientists can make complete descriptions of the tiny animals' brilliant coloring. The colors fade rapidly when the animal is preserved in alcohol, and as a result few people have ever seen the full beauty of the sea slug.

Dr. Harold J. Humm of the University of Florida ships specimens of the slugs, which are technically known as nudibranchs, to the Smithsonian by air in specially designed bottles of sea water to keep them alive for several days. The Smithsonian has one of the world's largest collections of nudibranchs.

Emperor of Japan Studies Them

An enthusiastic private collector is the Emperor of Japan, whose articles on slugs have been illustrated by leading Japanese artists. In addition to their colors, nudibranchs develop extensions of the skin and digestive tract that look like delicately modeled, tiny plants.

Nudibranchs live chiefly on small sea anemones found on the sea bottom. Most sea anemones are equipped with stinging organs—microscopic balls filled with virulent poison. As soon as a stinger ball is exposed to any tension it explodes, releasing the poison.

They Borrow Anemones' Poison

Sea slugs have the strange ability to eat these poison balls without exploding them. In some way, the balls pass through the digestive tract and into some of the appendages growing out of the digestive organs to the outside of the slug's body. There they are retained and serve the sea snail in the same way they served the sea anemone.

In earlier stages of their evolution, nudibranchs were shelled, like most land and water snails. Embryonic forms still have rudiments of shells which have been discarded by the race, presumably because they served no purpose.

Matchbox Striker Cleans Spark Plugs

THE striker panel torn from a penny matchbox makes a good abrasive for cleaning up the electrodes of oil-fouled spark plugs.

Copyrighted material

General SALVAGE CO. SURPLUS Bargain-SALE!

BUY DIRECT FROM THIS AD

BUILD YOUR OWN ARC WELDER OR LIGHT PLANT

D-C GENERATOR

Save $250 to $500

$15.50 used, good cond. Instruc. incl. for Comb. welder & light plant, 200 amps. 28 Volts. Or Brand New .....Price **$21.50**

PRICE F.O.B. K.C., MO.

CONVERTS TO ARC WELDER 200-250 AMP. OR LIGHT PLANT CAP. LOAD 5000 WATTS

Stock No. 711 D. C. Generator R-1 Jack & Heintz, rated 300 Amp. 30 Volts. Gov't cost $300.00. Instructions for converting to welder or light-plant incl.... **$25.50**

RHEOSTAT #R-27 Heavy duty for regulating the voltage on the converted P-1, R-1, Welder, & A.C.-D.C. type Generator..... **$6.95** post paid

New Amplidyne MOTOR GENERATOR. Use as 24/32 D.C. motor, pulls ½ HP. Applicable for 110 V. A.C. by simple change in connection. Applicable to independent and rural lighting. Instructions incl. Wt. 30 lbs. Cost over $140.00 **$7.50**

HYDRAULIC SOLENOID CONTROL VALVE BENDIX #81560 For remote control & for hydraulic cylinders. For 24V. D.C. & Applicable for 110V. A.C. 800 to 1500 P.S.I. $35.00 value. Instructions included... **$3.95** ea **$7.50** per pair

VALUABLE GEARS BARGAIN SPEED REDUCER 5:1 or 10-1 ratio 90 degree angle ½" splined shaft 3 mnt. holes rated 2 H.P..... **$6.45** post paid

INSECTICIDE PUMP SPRAYER FIRE EXTINGUISHER. Four gallon size includes approx. 3 ft. of high pressure hose with fine mist nozzle. Used, good condition built to give years of heavy duty service. Wt. 15 lbs. Price..... **$2.95** ea., add postage

CUNO OIL FILTER Aircraft type. Filters oil without cartridge replacements. Just turn handle and cartridge is clean. Standard ⅜" inlet and outlet ports. STOP CHANGING OIL. Instructions included..... **$4.95** post paid

GEAR HEAD MOTOR. Heavy Duty ⅛ H.P. 24V. D.C. 8400 R.P.M. Series Wound, reversible motor, to drive a reduction gear unit giving a 14:1 ratio. The gear shift runs 600 R.P.M. Unit is applicable for 110V. A.C. Instructions incl. Stock #921..... **$5.50**

DELCO MOTOR 6 Volt DC. Shaft is ¼" in dia., 1¼" long. Size 5"x3" two mounting studs. 1200-2000 RPM. Price **$3.50** post paid

MAKES IDEAL WINCH HOIST AIRCRAFT STARTING MOTOR operates on 12 to 32 Volts. Gives high torque, slow speed and tremendous power. Applicable for pulling or moving heavy loads. Makes ideal winch or heavy duty hoist. For belt or direct drive. Mfg. by Jack & Heintz. O. Cost over $300.00. Ship. wt. 55 lbs. Stock #J10..... **$9.95** f.o.b. KCMo.

SELF PRIMING ELECTRIC BLACK & DECKER MOTOR & PUMP UNIT. Ideal for oil burners, Aquarium fluid metering, coolant pressure lubricating, etc. Pump rated 2 G.P.H. Motor rated 1/30HP 1200 R.P.M. For 24 to 32V DC & applicable for 110V AC. Dimensions 7¾"x3¼"x3¼" Data incl. $50.00 value..... **$9.95**

ELECTRIC ACTUATOR Has a ⅛ H.P. 24V. D.C. 7500 R.P.M. reversible motor with push & pull actuator. Motor drives actuator in a 5" travel through a high reduction gear box. Ideal for remote control, lifting, lowering, etc. Complete with micro switches. Stationary load rating is 2800 lbs. & applicable for 110V. A.C. Stock #AA-LM. Instructions incl..... **$9.95**

THOMPSON MOTOR DRIVEN PUMP. Including built in motor. Applicable for 24V. D.C. & 110V. A.C. Ideal for pumping, fuel, oil, hot water heating circulator, etc. Capacity 300 G.P.H. Instructions incl. #1200.... **$7.50**

DILUTER DEMAND OXYGEN REGULATOR "Build your own diving lung" 1800 P.S.I. O. Aq. $85.00. Instruction incl..... **$6.45** post-paid

SOLENOID #804 Equipped with lever arm which gives a ½" or 1¼" travel. Compact, powerful as actuator & to operate locks, switches, toy applications, etc. For 24V D.C. & applicable for 110V A.C. Instructions incl.

Ea... **$2.95** Per Pair.. **$4.95** post paid

STRATOPOWER CONSTANT DISPLACEMENT PUMP For Operating Hydraulic cylinders, motors on tractors, bulldozers, etc. Rated 400 G.P.H. at 3750 RPM. 1250-1400 P.S.I. Has built in relief. #37. $150.00 value. Instructions included.. **$17.50**

PESCO OIL HYDRAULIC PUMP Gear type. Rated .227 cu. in rev. 198 G.P.H. 1500 P.S.I. Male splined shaft 11/16" dia. ¾" ports. #700.... **$9.95**

HYDRAULIC CYLINDERS AIR OR OIL Stock No. 512 Double action hydraulic cylinder **2⅛" Bore, 4" Stroke, ¾" Dia. shaft including built in Hydraulic control valve.** $75.00 value. Wt. 9 lbs..... **$8.95** f.o.b. KCMO.

Stock #11 Double action 1½" bore, 6" stroke, ⅜" Dia. shaft. Clevis mountings, 1100 lbs. with 1000 P.S.I. ..... **$8.95** post paid

Stock # 12 Double action 4" Bore, 10¾" Stroke, 1-5/16" dia. shaft. Rated 12560 lbs. with 1000 P.S.I. Clevis mounting. O. Gov't. cost over $300.00 **$27.50**

FOUR WAY HYDRAULIC VALVE Poppet type Spring loaded pressure balanced Open Center in Neutral position. 1500 P.S.I. ⅜" tube ports. #327..... **$7.95** post paid

No. 21 FOUR WAY HYDRAULIC VALVE Off at neutral with built in relief valve for limit of cylinder strokes. Control with 3 positions, raise, lower and hold, ½" pipe ports. #617..... **$9.95** post paid

PESCO EQUALIZER VALVE No. 397-D. New For 2 cylinders or 2 systems, will prevent uneven movement due to unbalanced load. Data incl. $75.00 value. **$9.95** post paid

HYDRAULIC ACCUMULATOR BENDIX Ball type 5½" dia. 2000 P.S.I..... **$5.50**

ACCUMULATOR Rated 2000 P.S.I. Approx. 1 Gallon Capacity 6" dia. 11" length ½" tube ports (4/4"-16 thread) New..... **$12.95**

FOUR WAY SOLENOID VALVE Operates on 24V. D.C. & applicable for 115V. A.C. For operating hydraulic cylinder, for remote control operation, etc. ¾"—18 thd. size ports. Brand New $50.00 value. #1213..... **$9.95**

Send CHECK OR M. ORDER. PRICES F.O.B. KCMO EXCEPT when marked POSTPAID U.S.A.

GENERAL SALVAGE CO., 2922 E. 27 St., Dept. 164, Kansas City, Mo.

New "PULL-GEAR" SPEED-REDUCING PULLEY

Provides Correct Speed and Power to Drill Up to 1⅜" with ½ H.P. Motor

Amazing new internally geared speed reducer doubles drill press capacity. Greater power, greater efficiency, greater productivity.

Provides the correct speed and power for larger drilling, reaming, tapping and boring on light presses. Easily installed in five minutes. Adaptable to all type machines. Spindle speed range approx. 45 to 3000 RPM. Made in 3 motor shaft sizes: ½"—⅝"—¾". Write for literature.

WRITE FOR LITERATURE

THE PULL-GEAR CO.

25429 Mound Road
Center Line, Michigan

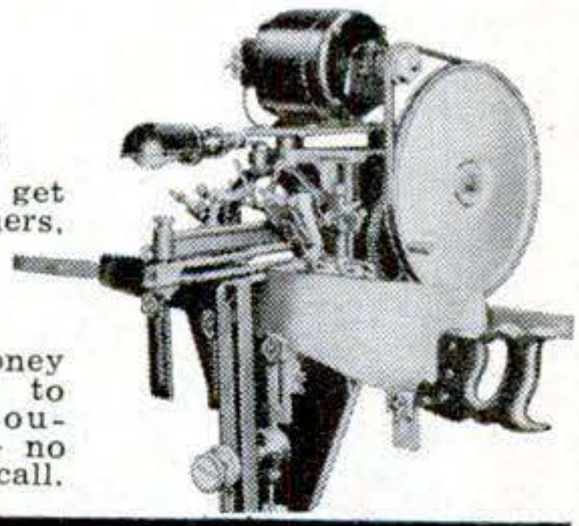
Make $20 to $30 a Week EXTRA MONEY!

With the high prices of food, clothing and everything else, just think what you could do with extra money every week! Turn your spare time into CASH—sharpening saws with a Foley Automatic Saw Filer pays up to $3 or $4 an hour. Start in your basement or garage—no experience necessary. "The first saw I sharpened with my Foley Filer came out 100%"—writes Clarence E. Parsons. No canvassing—"I advertised in our local paper and got in 93 saws"—says M. L. Thompson. With a Foley you can file all hand saws, also band and cross-cut circular saws.

FREE BOOK

Shows How to Start

It explains how you can get business from home owners, farmers, carpenters, schools, factories, etc. "I get work from 20 and 30 miles away"—says Charles H. Smith. Free Book, "Money Making Facts," tells how to start. Send coupon today — no salesman will call.



Send Coupon for FREE BOOK

FOLEY MFG. CO.
619-4 Foley Bldg., Minneapolis 18, Minnesota
Send FREE BOOK—"Money Making Facts."

Name.....

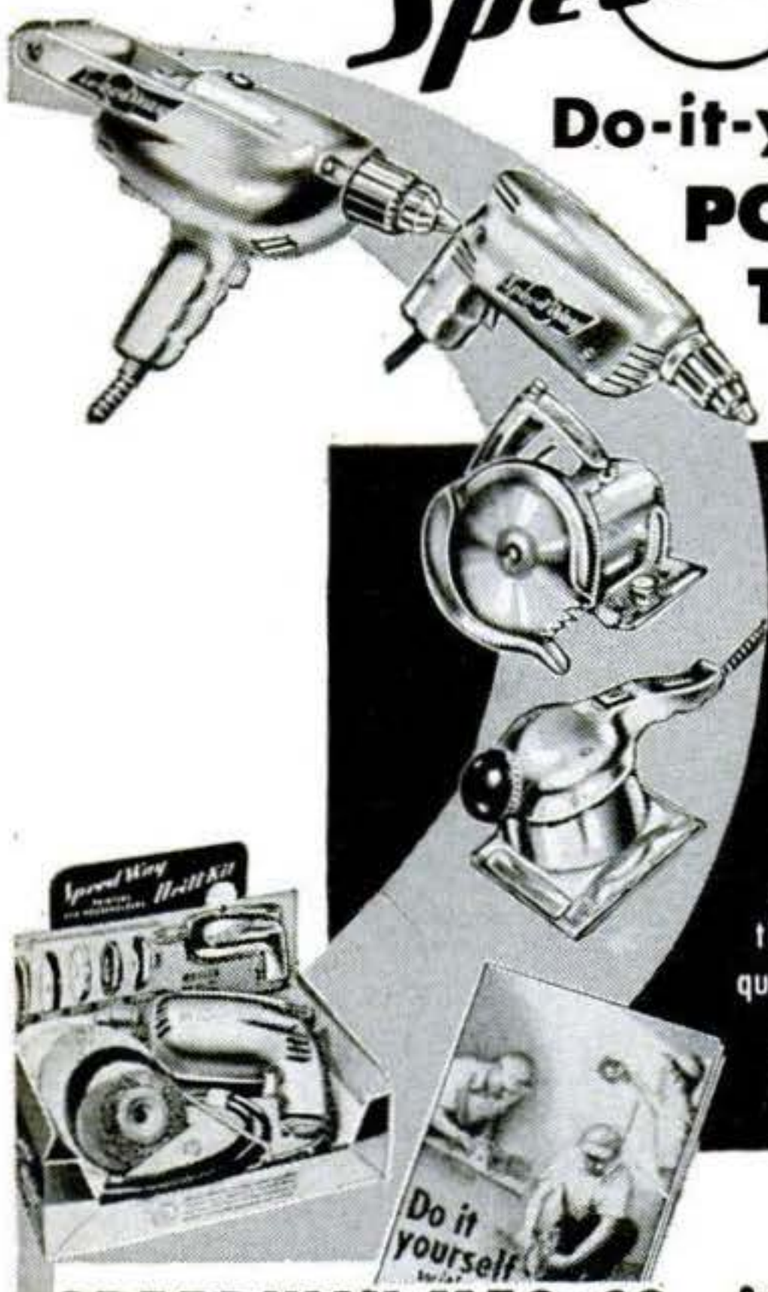
Address.....

Copyrighted material

Build, Repair, Re-model, Sand, Re-finish and Polish with

Speed Way

Do-it-yourself POWER TOOLS



• Speedway tools are becoming part of every well equipped home because they do so many tedious jobs easily, quickly and professionally. Write today for catalog showing these inexpensive quality tools sold by the better tool stores everywhere.

SPEEDWAY MFG. CO. *Builders of Quality Power Tools for Over 40 Years*

1864 So. 52nd Ave. CICERO 50, ILL., U.S.A.

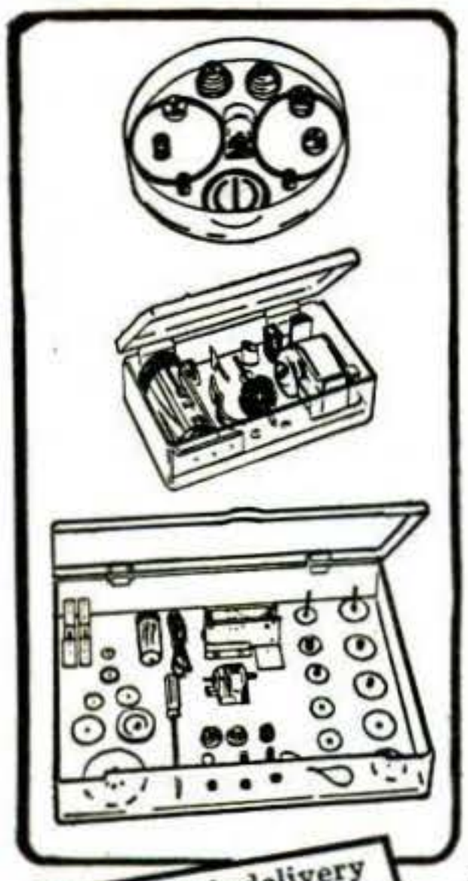
SAVE up to 80% on TOOLS with this new 1954 TOOL CATALOG

Hundreds of new money and time saving items illustrated. Tools for every possible use in home and workshop— at far below regular price. Send only..... **25c**

(refundable on first purchase).

SCOTT-MITCHELL HOUSE, INC.
Dept. PC-5, 611 Broadway, New York 12, N.Y.

MEET WILSON'S NEW INTERESTING KITS FOR 1954



Wilson's aim is to provide motor devices to the scientifically minded boy and hobbyist—dependable dry-cell motors and parts for applying them to models, experiments and use by industry. *Fully Guaranteed.*

Model 88—Pulley Kit holding in convenient plastic case set of 8 pulleys, 1 to 3-step, sizes ¼" to ¾", for 3/32" shafts. Complete with set screws and 2 pulley belts. **Price $2.00.**

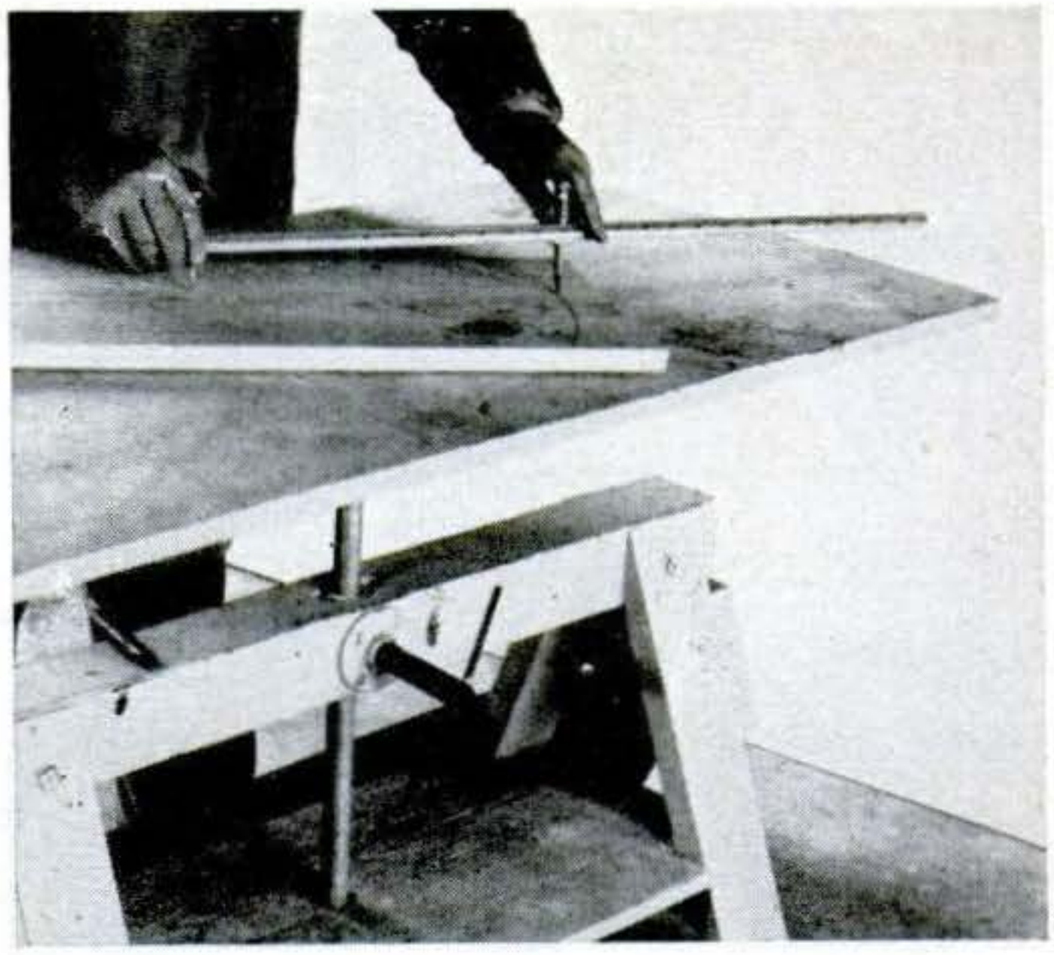
Model 3113—"Build it yourself" parts kit for "Tiny Atom" motor. Plastic case also contains shafts, brackets, connectors, worm gear, pulley, screws and educational instruction book. **Price $3.00.**

Model 700—Wilson's Super Power Kit—contains "Tiny Atom" motor, variable speed power applicator, gears, pinions, pulleys, friction drive, connectors, shafts, brackets, belts. Leaves nothing more to buy. In plastic case. **Price $10.00.**

Remit with order and we pay postage in U.S.A. No C.O.D. Add 3% Sales Tax for delivery in Ohio. Write Dept. PS.

For quick delivery see your local dealer — or order direct

WILSON'S OF CLEVELAND
425 Lakeside Ave., N.W. • Cleveland 13, Ohio



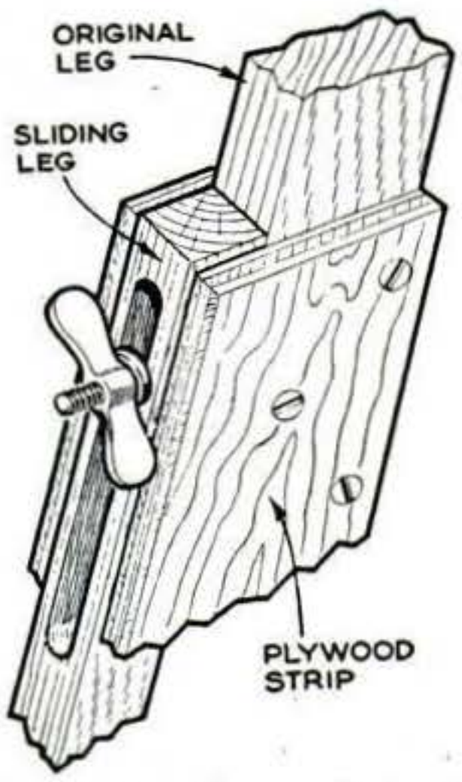
Graduated Compass-Point Bar

ATTACH a few feet of a dime-store, steel-tape rule to the wood strip you use with your trammel points, and you can set them to draw big arcs or circles exact size the first time. Holes for escutcheon pins can be punched in the tape or ground with a pointed stone in a hand grinder. Score the center of the clamp on each point with a triangular file for lining it up with the graduations.—*W. G. Waggoner, Sacramento, Calif.*

Foil Labels Foil Weather

A PERMANENT label for garden planting can be typed on aluminum- or tin-foil, and it won't wash off no matter how hard it rains. To make a sharp impression on the foil, lift the typewriter ribbon out of the way. The typed names can be cut off in strips and wrapped around the marking stakes.—*Robert Marie, Ft. Wayne, Ind.*

Slotted Leg Adjusts Table



TO SET up my picnic table evenly on rough ground I made one leg shorter than the others and then put strips of plywood along two edges of the leg, forming a groove. Then I cut a piece of wood with a slot in it to fit the groove. A wing bolt goes through the slot and a hole drilled in the leg, fastening the movable part to the original one at any point desired.—*Elmer Le Fevre, Rochester, N.Y.*

Copyrighted material

SAVE UP TO 85% ON GOVERNMENT SURPLUS

PAL SWIM FINS

New, first grade. Of top quality flexible rubber with treaded bottom and adjustable heel strap. Will float and are fully waxed for speed and protection. Vented for air and drainage. Sizes: Small, Med., large. 7.95 VALUE **2.99**

DIVING MASKS

Ideal for shallow water skin diving or swimming. Made of gum rubber with sturdy glass lens and adjustable head band.

SMALL	MED.	LARGE
99¢	1.49	1.98

Diving Masks and Fins shown herein are only a small part of our complete line send for FREE folder on others.

DIVING MASK WITH 2 BUILT-IN SNORKLE TUBES

Has full face mask, covering mouth and nose. Two built-in snorkle breathing tubes **10.95**

COMBINATION MASK AND HOOD

Protects hair, eyes and ears. For ocean or fresh water swimming and diving. Made of the finest live rubber. Comes with an edge sealed safety glass face plate. **12.50**

'SQUALE' GOGGLES

Used for swimming and diving by Navy Frog Men. **3.50**

NEW UNDERWATER FLASHLIGHT

Case is hard rubber. Absolutely water tight and pressure resistant. Gives sharp bright beam. . . **2.95**

GOV'T SURPLUS FLOATING LAMP

Originally A.A.F. emergency ditching equipment. A useful underwater flashlight or floating marker. Comes with 12 ft. of waterproof cord, for tying to object above or below the water. Rights itself, light side up. With battery and extra bulb. Surplus priced at . . **1.49**

B-7 GOGGLE KIT

Has special, soft spong rubber frame. Lenses are shatter resistant – consist of 1 clear and 1 green polarized lens. Ideal for cyclest, racer, etc. **1.49**

NEW SKIN DIVING SPECIAL

SCIENTIFICALLY IMPROVED

SPORT DIVER

Never before has a diving unit of such quality construction and extra features been offered at this low price. Tested and approved by: E.R.Cross, U.S. Master Diver for 14 years. The Sport Diver is a completely equipped unit. Has a high pressure air flask, tank valve, pressure reducing regulator, breathing tube, demand regulator, mouthpiece and harness. Recommended for use in depths up to 30 ft. The special (1800 PSI) air tank can be refilled by most dealers of welding and cutting gasses. Completely tested and ready to use. ALL NEW! A $115.00 Bargain Value for ONLY **79.95**

NOW! BUILD-IT-YOURSELF DIVING LUNG

NOW you can build your own diving lung. Our special folder of instructions completely describes how it's done. Kit includes Air Bottles, Pressure Regulator, Hoses, Safety Belt (B-14), Shoulder Harness, Clamps, Mouth Piece, Valves, etc.

With 2 bottles (1 hour time) **45.95** $150.00 VALUE

FREE FOLDER Containing past Popular Science article describing how to build your own diving lung. Folder also contains the latest Palley discoveries and developments in Underwater Diving Equipment. Send for your copy TODAY!

PALLEY SURPLUS FOR DIVING EQUIP.

AN-6004-1 Type DILUTOR DEMAND PRESSURE REGULATOR

Similar to type recommended by the Popular Science Magazine. Gives proper regulation of air flow. While they last . . . . USED **10.95**

QUICK RELEASE SAFETY BELT **1.99**

G.I. SURPLUS CARTRIDGE BELT

Cartridge pockets allow for better balancing of ballast weights. **89¢**

COMPRESSED AIR TANKS

Shatterproof. Designed to stand pressure of 1800 PSI. Tested and approved. Ready to use. . . . . .

22 cu. ft. cap. (30 min. limit time) **9.75**

38 cu. ft. cap. 45 minutes under water **12.75**

Palley SPECIAL / Gives up to 1 hour underwater at average depth. Has 15 lb.. capacity – 48 cu. ft. Size: 6½"diam. x 23½". **17.95**

NEW CO2 HARPOON GUN

Has JET POWER – One of the simplest, most effective underwater guns you can find anywhere. Designed for one-arm use. Weighs only 27 ounces. Has 13 ft. of 150 lb. test NYLON line on a snag proof reel. Positive safety catch. All-metal body. Rust resistant finish. Uses CO^2 charges for power. . . . . A $29.95 value for ONLY **13.95**

CO^2 CHARGES – Box of 10 new charges for above gun . . . **79¢**

SNORKLE TUBES

All plastic. Rubber mouthpiece. Permits breathing with face submerged. Ball valve seals tube when unit is immersed. **2.95**

SNORKLE without Valve **1.95**

NEW WADING SUITS

Back in Stock AGAIN! Makes surf and deep stream fishing a pleasure. Ideal for use wherever it is necessary to protect the body or clothes from muck, silt, moisture, etc. Made to top Gov't specifications of rubberized canvas. Has vulcanized seams & built-in rubber gloves and boots. . . . **10.95**

SAVE $8.00 ON NEW HY-SCORE .177CAL. AIR RIFLE

WAS $18.95 **10.95**

Take advantage of our CUT PRICE PURCHASE! SAVE! Made in Belgium for the famous Hy-Score Company. Has an ALL-STEEL, fully rifled barrel, 17" long. Requires no pumping, just cock and fire. Shoots .177 caliber pellets or darts. Stock is a beatiful, natural finish hardwood. Makes an ideal training rifle for youngsters – also excellent for indoor or outdoor targets. Weight 5 lbs.

AQUA MITTS

Finest live rubber. Web fingers. For swimming or diving. **1.95** PAIR

GOV'T SURPLUS MAE WEST LIFE VEST

A pneumatic life saver. Used by fishermen, swimmers, boatmen, etc. Will safely support up to 250 lbs. Can be inflated by mouth or with CO^2 cartridges (listed beneath Harpoon Gun below).

USED **2.95** NEW **4.95**

AIR CORPS RUBBER BOATS USAF SURPLUS

Made to government specifications. An ideal boat for Fishing or Hunting in river, lake or ocean. Safe, lightweight, easy to pack. Reconditioned and ready to use.

1 MAN **22.95** 5 MAN **59.95**
7 MAN **69.95** 10 MAN **110.00**
HAND AIR PUMP 3.95

CORNELIUS AIR COMPRESSOR

A 3 stage, 1500 PSI Air Compressor. Has built-in 1/3 HP, 27 volt, 20 Amp DC motor. Compressor delivers .4 CFM. Has a built-in safety valve. Adapt for filling diving air tanks, laboratory use, etc. ONLY **32.50**

GOV'T SURPLUS AIR HOSE

Connects to air supply and mouthpiece.

23 inches long **49¢**
42½ inches long **75¢**

ARMY FIELD PHONES

A private phone or intercom system. Easy to operate. Ideal for use on farms, target range, mountains or forest or any place portable two-way communication is desired. Gives clear reception up to 2 miles. Uses two standard batteries. Set contains ringing generator, leather carrying case and one phone. Several of these phones may be used on one line.

Price per each phone **14.95**
Price for a system of two sets **29.95**

WORLD'S MOST AMAZING BARGAIN CATALOG

320 PAGES FULLY ILLUSTRATED

Packed with **SENSATIONAL VALUES** in **WAR SURPLUS, FACTORY CLOSE-OUTS** and **GENERAL MERCHANDISE!**

Thousands of items for the HOBBYIST, GADGETEER, etc. Includes Hand & Power Tools, Microscopes, Binoculars, Precision Instruments, Outdoor & Sport Equipment, Photo Supplies & Cameras, Hardware, Foam Rubber, Industrial Tools, Aircraft Supplies such as – over 20,000 Hydraulic Cylinders in 61 sizes & types, also Hydraulic motors, pumps, fittings, tubeing, valves, etc. Also hundreds of War Surplus Gadgets and parts.

SAVE 85% PALLEY'S "GADGETEER'S HEAVEN" WAR SURPLUS AND NEW MERCHANDISE — PALLEY SUPPLY CO.

SEND 50¢ To cover the cost of HANDLING & MAILING – REFUNDED with your first order!

Palley SUPPLY COMPANY
2263 E. VERNON AVE., DEPT. PS-6
LOS ANGELES 58, CALIF.

Order From This Ad. Pay by M.O. or check. P.O.'s accptd. from D&B firms. ½ deposit with C.O.D.'s. All Prices FOB Los Angeles.

How Much Did You Learn?

By Stanford E. Taylor and Helen Frackenpohl
Washington Square Reading Center, New York

Now you can sample how much you remember of the useful and interesting information packed into this issue of POPULAR SCIENCE MONTHLY. Answers to the questions are printed just below the quiz. After each answer is a page reference to the article on which the question was based.

1. *The earth's wobble is thought by scientists to be due to*
a. variations in the size of its surface
b. changing magnetic strength in its core
c. currents created in its liquid center

2. *This girl is*

a. fueling a lawn lamp
b. tending a mosquito trap
c. measuring dew

3. *Trailer life has changed. Three-quarters of all trailers are now*
a. bought by vacationers
b. thirty feet or longer
c. moved only by special trucks

4. *One big drawback to buying very powerful binoculars is*
a. unsteady viewing
b. difficult focusing
c. a duller image

5. *The hose for your diving outfit won't snag readily on underwater objects because*
a. the diver is careful to keep it taut
b. the pump man keeps check on it
c. it floats, stays safely on the surface

6. *Millions of tons of rock will be blasted from the river bed above Niagara Falls to*
a. increase hydroelectric-power output
b. enhance the beauty of the falls
c. provide a firm base for a new bridge

7. *The Baker Electric had a fast get-away, and a top speed of*
a. 15 m.p.h.
b. 20 m.p.h
c. 30 m.p.h.

8. *The slow and seemingly safe tractor caused an amazing number of deaths in 1950:*
a. 450
b. 640
c. 970

9. *The Canadian Rockies are tough on mountaineers because of*
a. almost vertical faces
b. remote locations
c. strong winds

10. *Safety engineers on Oklahoma's new Turner Turnpike have set a minimum speed of*
a. 40 m.p.h.
b. 45 m.p.h
c. 50 m.p.h.

Answers: 1. c—p. 96; 2. b—p. 108; 3. b—p. 116; 4. a—p. 203; 5. c—p. 163; 6. b—p. 144; 7. b—p. 138; 8. b—p. 133; 9. a—p. 90; 10. a—p. 128.

NEXT MONTH . . .

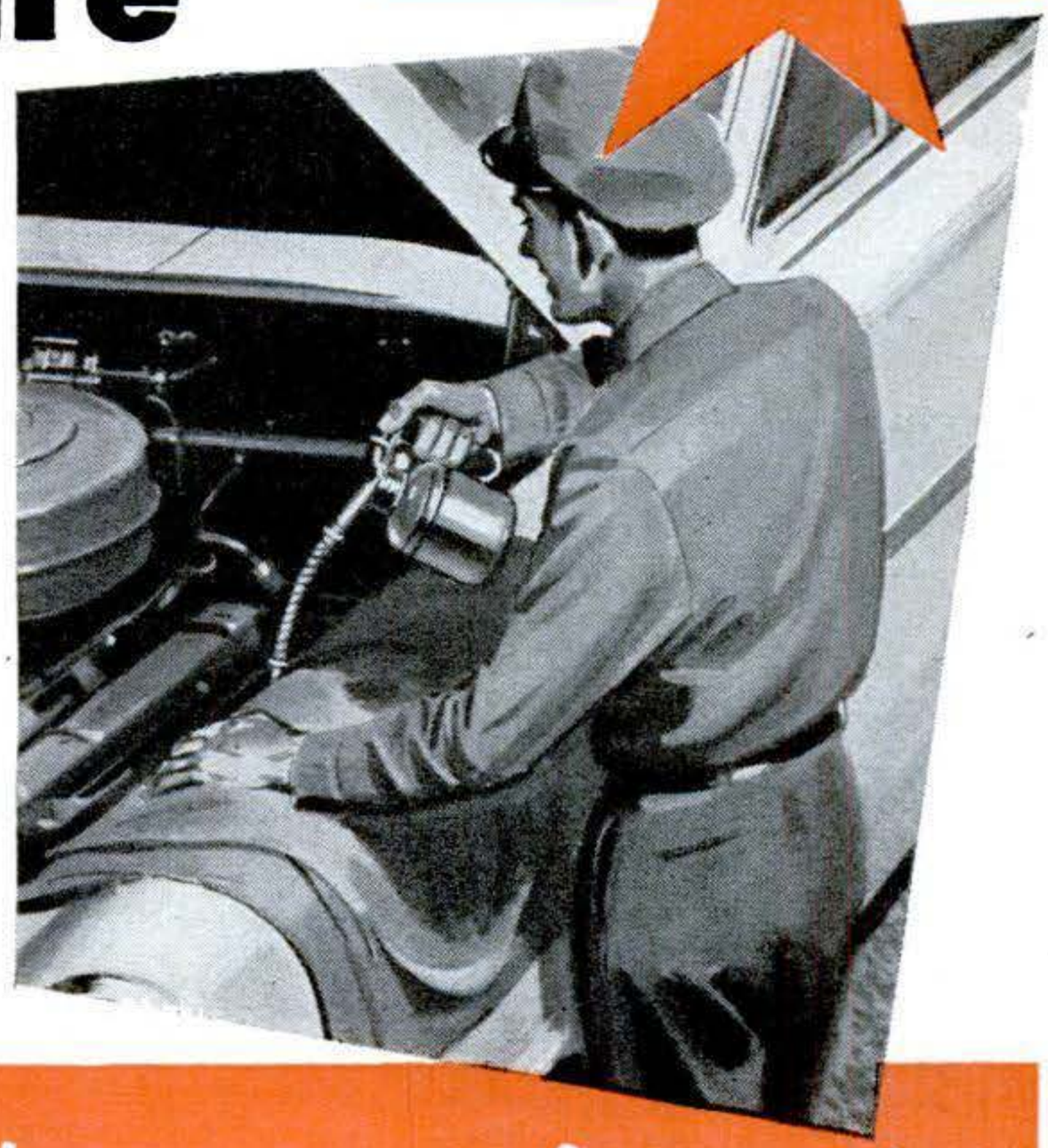
Popular Science's Annual How-to-Do-It Index

Want to build a wall . . . model a clipper ship . . . grow a tree . . . paint a house . . . retop a convertible? An index of how-to-do-it articles on those subjects and hundreds more in PSM during the past 12 months will be included in the July issue.

Copyrighted material

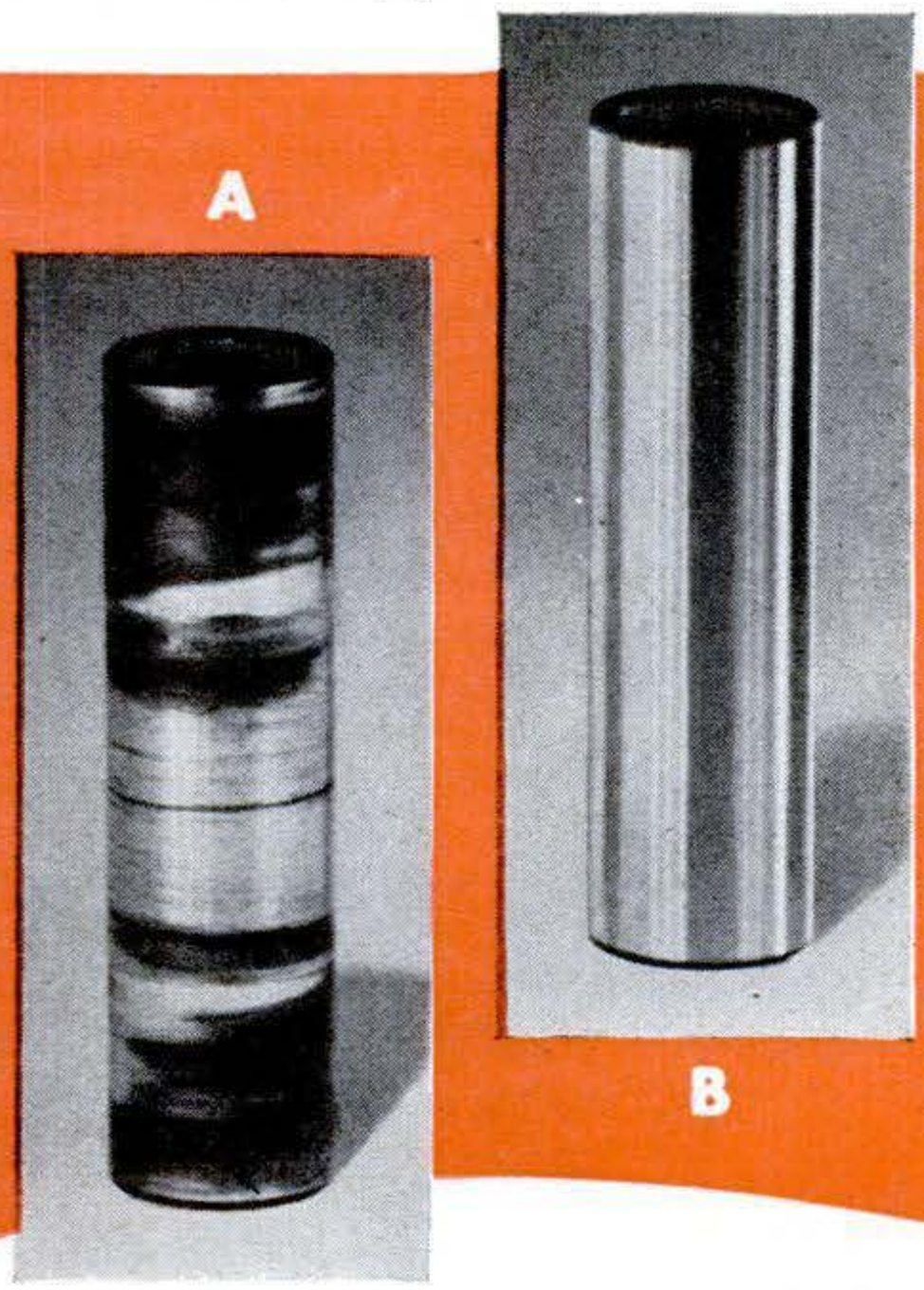
Texaco Tips

on car care



How to help keep your brake system in safe condition

Your car's hydraulic brake system is your No. 1 safety guard while driving. To keep it in good operating condition, see your nearby Texaco Dealer for inspections. He will check brake lines, making certain there are no leaks. He will check the fluid level in the master cylinder. If necessary, he will add fluid. Your Texaco Dealer's know-how helps make your driving safer —and more enjoyable.



How to wear-proof your engine

Nature's best motor oil couldn't keep up with today's high-compression engines. So Texaco engineers developed a motor oil that actually *wear-proofs* your engine for the life of your car — *Advanced Custom-Made Havoline*. With its Balanced-Additive formula, Havoline keeps your engine clean, free from harmful sludge, rust and acids. Notice the difference between these two piston pins after a tough 21 hours of stop-and-go tests. Pin "A" shows rust deposits even with a good heavy duty motor oil. But pin "B" remained clean and rust-free—proof that today's best motor oil is *made* . . . not born. Drive in for *Advanced Custom-Made Havoline* today! See your Texaco Dealer . . . *the best friend your car has ever had.*

THE TEXAS COMPANY

TEXACO DEALERS

in all 48 states

Texaco Products are also distributed in Canada and in Latin America

Copyrighted material

The Truth about Super-Batteries

Are international cartels trying to suppress them?
Will they really re-charge themselves?
What about silver, etc., plates?
How good are long-life guarantees?

by Frank E. Williams

WHAT CAN YOU BELIEVE—and what can't you believe—about claims being made for batteries today? Since I'm the man who started all the excitement by producing the Life-time battery, you might as well get the facts—once and for all—straight from me.

First, let's discuss what seems to be the most popular claim made by the half-dozen or so companies that have sprung up in the last few months:

"Secret European (type) *battery now available here!"* To begin with, all batteries are European "type," dating back to Volta's original discovery in 1801. As for modern European batteries, we tested the best of them—a German job—and it skinned everything in sight except the Life-time battery (we won that test by such a narrow margin we'd rather not talk about it), but there wasn't anything secret about the way the German battery was made: just good workmanship.

What about silver, etc., plates? Our search for the ideal plate material went back through the original discoveries of Volta—included investigation of Ritter's gold-ammonia battery and Gautherot's fantastically expensive platinum plate design over 150 years ago. True, these were Europeans, but the alloy we ultimately selected and named the "neutronic" plate is a product of American metallurgy that Europeans probably will never be able to duplicate.

Are international cartels trying to suppress a super-battery? Frankly, the only opposition to the Life-time battery has been hard, defensive selling from U.S. manufacturers who—understandably—don't want to spend millions in costly re-tooling to produce an entirely new kind of battery. *International cartels?* Bunk! Anyone in this country who complains about any kind of "suppression" hasn't got a battery worth suppressing—they're just crying to get attention.

Can any battery really re-charge itself? Yes. Any good battery will recuperate if you give it a few minutes' rest after running it down. The difference is: how fast will it bounce back? and how many times? In a test by Motor Trend magazine, the Life-time battery set a record by bouncing back to life 23 times, and still had more power than the two famous brands it was tested against.

How good are long-life guarantees? Right now, some companies are advertising fantastically long guarantees in order to sell batteries—but they haven't got either the product or the finances to back them up, and a lot of people may be disappointed in a year or so if their batteries go dead and the company that sold them has gone out of business. Your safest bet is to buy only from a reputable dealer.

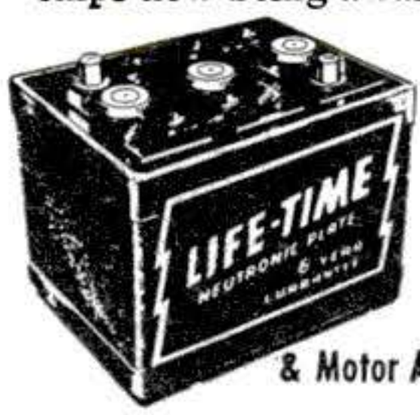
Then what about the 6-year guarantee on the Life-time battery? A fair question. Even though one of the prototype Life-time batteries is still going strong after 11 years, we set a 6-year limit on our guarantee—a figure so conservative that a multi-million-dollar bonding company has added its backing to our own.

Check the price, the guarantee, and the company before you buy! We sincerely believe that the Life-time battery, with a legitimate six-year bonded guarantee, is the only really outstanding value on the market today. One price for all cars and standard trucks: $29.95 for six-volt sizes, $34.95 for 12-volt sizes (plus a complete line of marine and industrial batteries). If your dealer doesn't have the Life-time battery yet, (10,000 dealers do), show him this page and ask him to order one for you—or write us for the name of your nearest Life-time battery dealer.

the *LIFE*-TIME Battery

An American Success Story

When California inventor Frank Williams turned his attention from professional engineering and invested his personal fortune in the development of the Life-time battery, he started a chain reaction that has brought vastly increased incomes to 10,000 dealers and distributors in the U.S. and abroad. Batteries are now rolling out of four plants to meet tremendous consumer demand, and with over $1,000,000 slated for "the most ambitious battery advertising campaign of the decade," the company expects to double present sales within eight months. For information about dealerships and distributorships now being awarded, write:



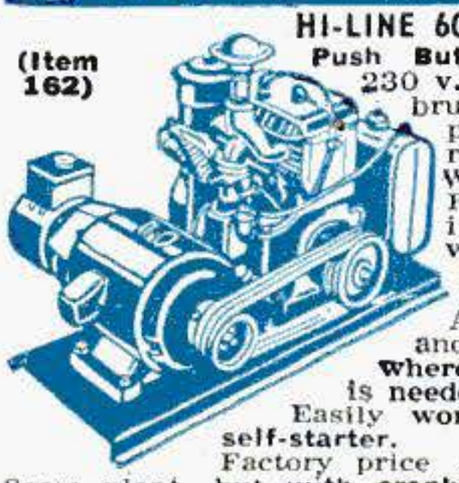
CONTINENTAL MANUFACTURING CORPORATION

Dept. PS-6
Washington Blvd. & Motor Ave., Culver City, Calif.

Copyrighted material

BUY DIRECT-FROM-FACTORY → at LESS THAN WHOLESALE

HI-LINE 6000 WATT PLANT



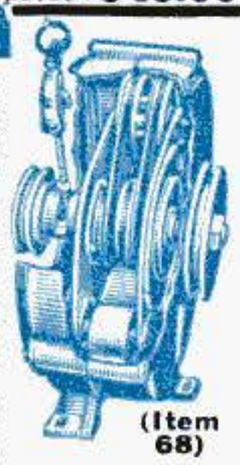
(Item 162)

Push Button Start 115-230 v. 60 cyc. A.C. A brute of a power plant with a rugged 14 hp. Wisconsin engine. Plenty of electricity for ranges, water heaters, freezers, pumps, machinery, etc. Affords both 110 and 220 volts. Ideal where heavy current is needed. Wt. 590 lbs. Easily worth $995. With self-starter. Factory price **$645.00**

Same plant, but with crank start, **$585.50**

Generator and control box only, belt driven. Use your own engine or tractor. Wt. 240 lbs. (Item 163) Factory price **$345.00**

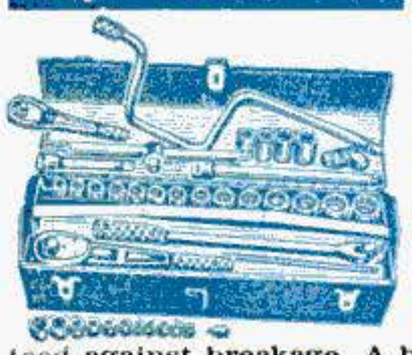
Variable Speed Selector



(Item 68)

Heavy duty, made by **B. F. GOODRICH** for industrial use. Provides instant speed changes for any drive. For machine tools, dryers, printing, conveyors, production lines, hoists—any operation requiring variable speed. Employs reliable "trouble free" planetary system. No hydraulic power losses. Infinite range, smooth operation, easy installation. 3 sizes: ½-1 hp. 36 lbs.; 1-2 hp. wt. 55 lbs.; 2-3 hp. wt. 105 lbs.; Reg. list $228, $252 and $352. Our prices ... **$79.50, $89.50** and **$114.50**

52 pc. SOCKET SET

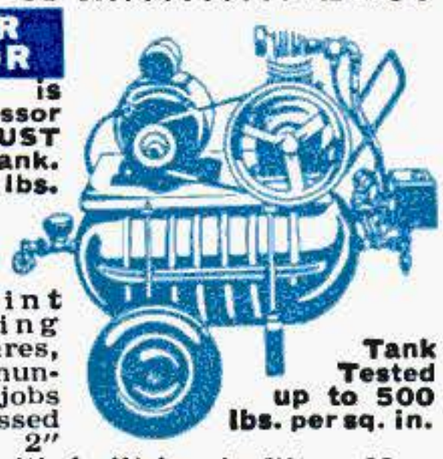


Highest quality, guaranteed non-breakable sockets made by Husky. Beautifully matched chrome thin wall alloy absolutely the best. Contains a complete set of 28 sockets in ½" drive, ⅜" drive and ¼" drive, plus all necessary extensions, handles, speeders, reversible ratchets, etc.; all uncond. guaranteed against breakage. A beautiful set of tools that will handle any job; in a big doghouse steel box. Wt. 17 lbs. (Item 205) List price $62.90. Factory special.. **$27.95**

44 Pc. SOCKET SET

(Item 596) Same unconditionally guaranteed, non-breakable sockets as above. Complete range of 21 sockets from ¼" thru 7/16" (¼" drive) & 7/16" thru 1-1/16" (½" drive). Two extensions, reversible ½" ratchet, 3 drift punches, sliding "T" head, all angle coupling, ½" speeder, ¼" breakover, 5 pc. high chrome alloy combination wrench set and 8 pc. offset wrench set in big doghouse tool box with ample room for other tools. Reg. $49.50. Wt. 16 lb..... **$21.95**

MASTER AIR COMPRESSOR



Tank Tested up to 500 lbs. per sq. in.

COMPARE! This is the only compressor built with a NO RUST stainless steel tank. Safe up to 500 lbs. (Item 209) High pressure type for large volume of air for heavy duty service. For paint spraying, inflating truck & auto tires, greasing & the hundreds of other jobs done by compressed air. Piston type. 2" bore compressor with built-in air filter. Master built with high strength alloys and precision bearings. Tank, 12"x24", 2100 cu. in. cap. Equipped with automatic switch that starts and stops motor to maintain desired pressure (up to 150 lbs.) and check valve, safety valve, gauge, shut-off valve, 20 ft. air hose and tire chuck. Beautifully balanced on ball bearing wheels and rubber tires. Don't take chances with used or surplus equipment. Our compressors are factory new and are guaranteed **SAFE.** Low factory prices. With ⅓ HP., 110 v. AC motor. Reg. $175. (Item 209p)..... **$109.50**

AIR COMPRESSOR ACCESSORIES

Pressure Gauge, range 0-160 lbs. ¼" pipe thread connection, 2" face.. **$1.50**

Check Valve, solid bronze, 200 lbs. pressure, works in all positions. ¼" or ⅜" pipe threads, (specify)..... **$3.35**

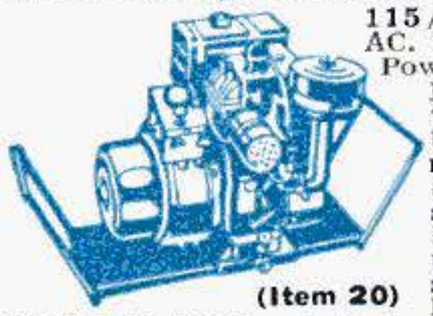
Pressure Regulator, solid brass, std. ¼" pipe thread, reduces any pressure to a range of 0-50..... **$3.75**

Pop (safety) Valve, adjustable from 0-200 lbs. ¼" pipe thread..... **$1.40**

SPECIAL . . . All four above.....$8.95

Pressure Switch for pumps and compressors, 0-85 lbs., **$5.95**; 0-150 lbs. with unloader (3 HP), **$10.95**; 0-200 lbs. (5 HP), **$12.95**

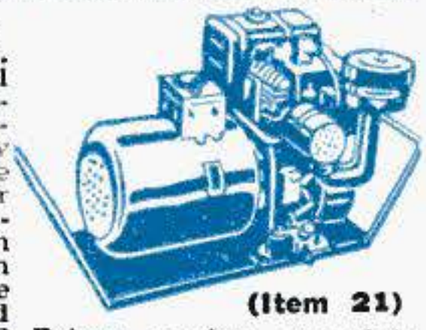
PORTO-POWER 1500-1700 WATT PLANT



(Item 20)

115/130 v. 60 cyc. AC. Push button start. Powered by a 5.10 HP Briggs engine. This plant combines the compactness and easy portability of the smaller plants, but has a high output to handle heavier starting loads. Built-in winding for charging 12 v. batteries. An ideal standby power plant for operating lights, sump pumps, oil burners and communication systems. Perfect for contractors and line crews. (Item 20.) Wt. 146 lbs. Factory Special Price..... **$279.50**

MASTER-LITE 2500 Watt Plant



(Item 21)

110/120 v. 60 cyc. AC. A powerful plant, ruggedly constructed and yet designed for easy portability. Can be started by rope or built-in 12 v. electric push button starter. Built-in winding to charge battery. Powered by a big 5.10 HP Briggs engine, complete with all accessories. Includes control box, voltmeter, and handy plug-in power receptacle. An ideal plant for permanent or stand-by service. Wt. 225 lb. Reg. price $645.00 (Item 21) Factory Price..... **$329.50**

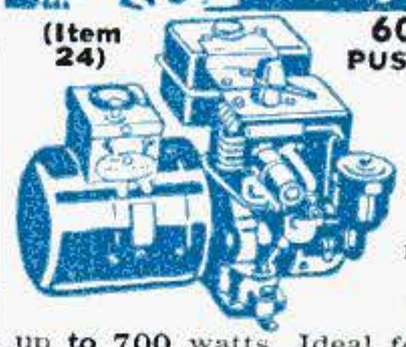
3000-3500 WATT PLANT (Item 198) 110-220 v. 60 cyc. AC Belt Drive. Wis. engine **Push Button Start.** Wt. 370 lbs. Heavy duty **$399.50**

GENERATOR ONLY for belt drive..$239.50

PORTABLE LIGHT PLANTS

Ideal for your camp, cottage, trailer or boat!

600-700 WATTS
PUSH BUTTON START



(Item 24)

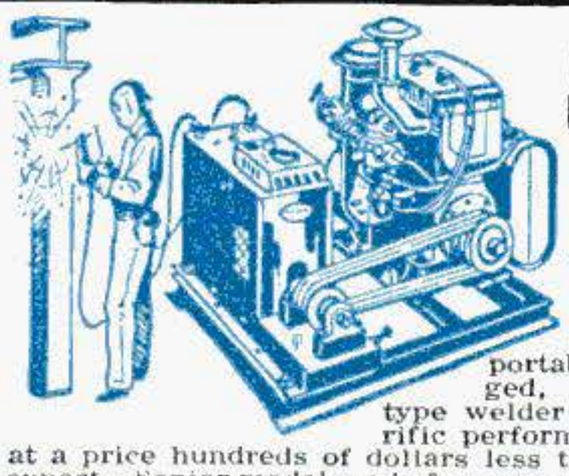
115 v. 60 cyc. AC Powered by a rugged 2 HP easy starting Briggs engine. No wiring necessary; just plug in and operate. Plenty of current for any oil burner, freezer, brooder, emergency lights, etc. which require up to 700 watts. Ideal for Civil Defense and Fire Dept. Complete with Voltmeter and built-in winding to charge 6 v. auto batteries. (Item 24.) Wt. 75 lbs. Easily fits in car trunk. Be prepared if storm knocks out power lines. Reg. $275 value..... **$143.50**

1000-1200 Watt Plant (Item 45) same as Item 24 but larger generator and engine with 50% greater output..... **$199.50**

LITTLE GIANT—350 WATT (Item 273) 115 v. DC 1½ hp. Briggs engine. Perfect for lights, radios, small power tools. Wt. 65 lbs. Factory price..... **$99.75**

We make fully automatic controls to operate any of the above light plants. Write for details. **We make all sizes up to 25,000 Watts.**

POWER MASTER DC ARC WELDERS



Now! a portable, rugged, industrial type welder with terrific performance, yet at a price hundreds of dollars less than you'd expect. Senior model made for years of trouble-free, continuous service. High capacity DC welding unit enables you to tackle any job with confidence—easily welds anything up to 2" plate using from 1/16" to ¼" rods. Built-in stabilizer and cooling system makes arc easy to strike and hold. Dual control rheostat provides low heat soldering, brazing and welding from 30 to 300 amps. Complete with instructions, guarantee and triple V-belt or flat pulley. You can pay more, but you can't buy a better welder.

WELDER ONLY — DUAL CONTROL MODEL. Same as above, but drive with your tractor, jeep or gas engine of 14 HP or more. (Item 38a.) Wt. 110 lbs. $450 value..... **$119.50**

WELDER ONLY—STANDARD MODEL. Same as above but with single rheostat for heavy metal welding only. (Item 38.) Wt. 110 lbs. $400 value. Special... **$99.75**

COMPLETE POWER MASTER (Illustrated above) powered by a 14 hp., air cooled Wisconsin engine. Wt. 480 lbs. (Item 280) Compares with welder costing $1200. Factory price..... **$449.50**

WELDING KIT, Two 10 ft. leads, welding helmet, electrode holder, ground clamp. Sold only with welder..... **$10.50**

GIANT 2000-2500 WATT PLANT

(Item 31)

110-120 v. 60 cyc. AC. absolutely the best made — exclusive dynamically balanced armature; heavy windings develop up to 5000 watt overload for motor starting. Skid mounted — portable. Powered by an easy starting Briggs or 6 HP Wisconsin engine—complete with all accessories; engine easily disconnected for other uses. Big outlet box, voltmeter, no wiring necessary. Ample current for all purposes. Factory warranty. (Item 31) Wt. 210 lb. Reg. price $585. Special at..... **$299.50**

Same plant with electric self starter (Item 31a)..... **$359.50**

Generator only and control box....**$169.50**

DUAL VOLTAGE 110-220 available on any of above models for $28.00 additional.

EXTENSION CORD

(Item 16a) Heavy duty, made of Buna rubber insulated #14-2 conductor, stranded wire encased in a treated braid jacket. **So tough that you can drive over it.** Use indoors or out. Resists oil, grease or water. Extends electricity up to 400 ft. without voltage drop. Complete with heavy rubber plug and outlet. (Item 16) 40 ft. 2½ lbs..... **$1.99**

Combination 2-40 ft. and 1-20 ft. (total 100 ft.).....(Item 16c) **$4.95**

NEOPRENE CABLE #14-2 (Item 185) Heavy duty, very flexible, 20 year quality. Wt. 9 lbs. 100 ft. Complete with rubber plug and outlet. *A terrific buy at only*..... **$8.95**

NO. 12-2 POWER CABLE. Very flexible rubber covered, special outside shield for grounding power tools, etc. 50 ft. (Item 199) wt. 8 lbs. **$6.95.** 100 ft. (Item 200).....**$12.95**

MASTER GARDENER — SELF-PROPELLED

It's a lawn mower — **It's a rotary tiller**
It's a power sickle — **It's a bulldozer**
It's a cultivator — **It's a snow blower**

NO PUSHING

Tractor shown with 20" Rotary Mower Attachment

(Item 206)

Where else can you get a power tool that does so many jobs? Works for you year 'round. Does terrific job of cutting grass or weeds. Or prepares mellowed, deep seed beds without labor. Built-in power take-off to drive pumps, saws, etc. Safety clutch—can't burn out. New gear tread tires assure non-slip drive. The Master Gardener performs better — does more than tractors costing twice as much. Converts in minutes to Tiller, Power Sickle, etc. Basic tractor with Briggs and Stratton engine. Only.. **$119.50**

Rotary Lawn Mower.....**$42.50**
Sickle Bar Mower.....**$42.50**
Lawn Mower Hitch.....**$4.50**
Furrowing Tool **$8.75** — Rotary Tiller .**$42.50**
Cultivator ....**$8.75** — Disc Harrow .**$15.75**
Snow Blow **$38.50** — Plow **$15.00**

Freight prepaid. Easy payment plan available.

HEATING & VENTILATING FAN

(Item 10) Easily installed in furnace pipes. Forces even heat to all rooms. Over range removes kitchen smoke and odors. Powerful, continuous duty motor, 110-120v. AC. Mount in wall or ceiling to ventilate any area. Quiet, super-efficient fan moves huge volume of air. (400 to 600 CFM).

8" Fan, wt. 5 lb.....**$6.85**
9" Fan, wt. 6 lb.....**$7.85**
10" Fan, wt. 7 lb.....**$8.85**
12" Fan, wt. 8 lb.....**$9.85**

HEAVY DUTY FAN. Semi-enclosed motor, suitable for spray booths, restaurant exhausts, poultry houses, etc. 10" Fan, wt. 8 lbs. (Item 10E).....**$11.95**
12" Fan. wt. 10 lbs. (Item 10D)....**$12.95**

CONDITION-AIRE EXHAUST FANS

Save big money installing your own exhaust fan. Efficient propellor type blade moves huge volume of air quietly and effortlessly. Heavy welded frame — pre-drilled for easy installation. Just cut opening and bolt in place. **Continuous duty** motors. **Ideal for** attics, restaurants, garages, barns, chicken houses, etc. Control manually or with thermostat.

Blade	Opening	CFM	Wt.	Item	
16"	18¼"	2925	19 lb.	365a	**$27.95**
18"	19¼"	3600	27 lb.	365b	**$31.95**
20"	21¼"	4100	30 lb.	365c	**$39.95**

SHUTTERS—open automatically, 16", wt.10 lb. **$9.00**; 18", Wt. 12 lb., **$10.25**; 20" Wt. 14 lb. **$11.25.**

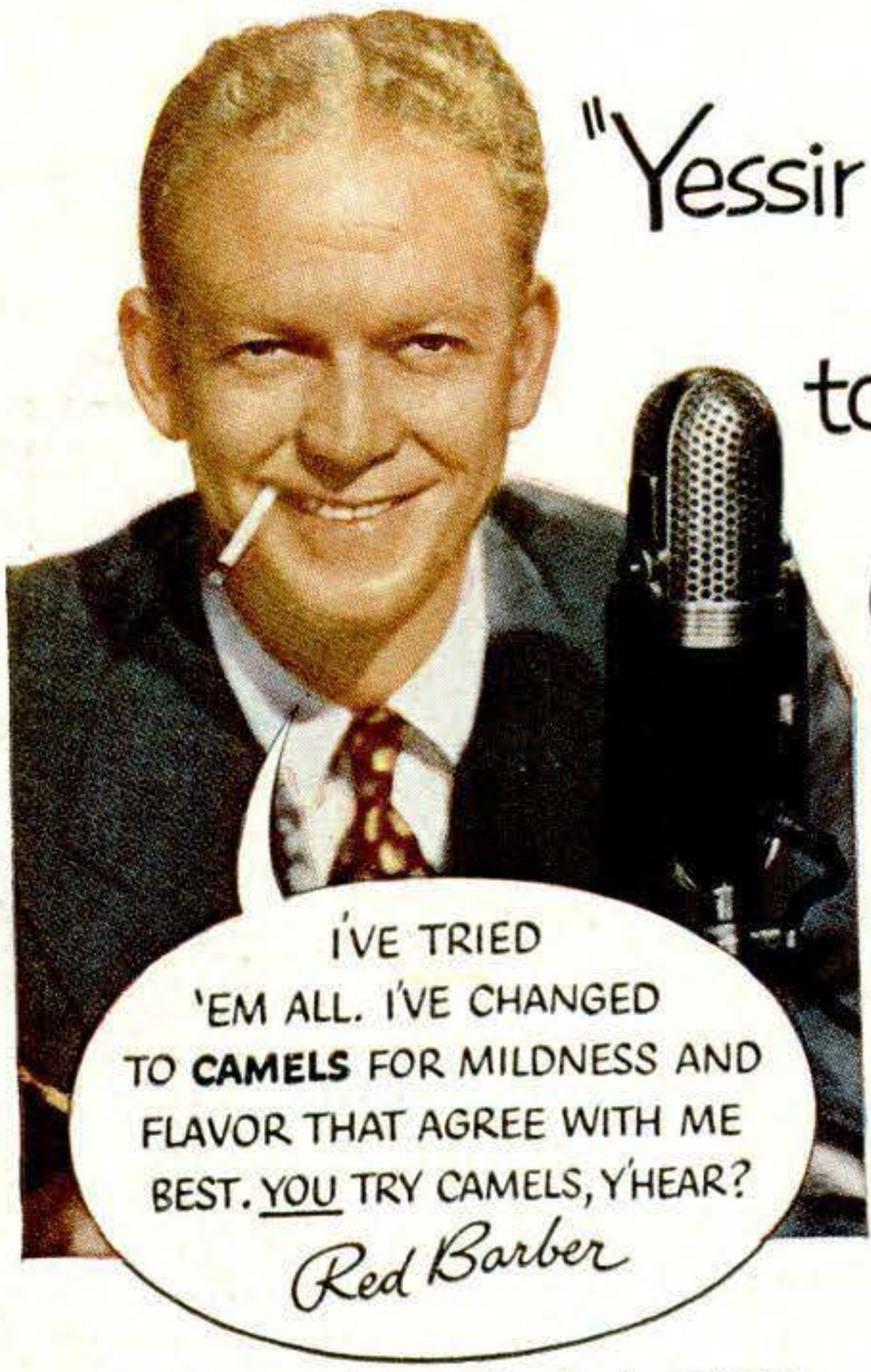
THERMOSTATS; BARN type (range 40°-60°). Wt. 2 lb. **$6.95.** ATTIC type (50°-90°) Wt. 2 lb.....**$11.95**

Send check or M.O. Prices f.o.b. Factory. 10 day Money back guarantee. SEND 10c for ... BIG 1954 Catalog

MASTER MECHANIC MFG. CO., DEPT. 18H **Burlington, Wis.**

"Yessir! the Ol' Redhead has changed to CAMELS"

(choice of many of his friends in the Major Leagues!)



RED BARBER, *Famous Sports Announcer*

BOB LEMON, Cleveland Indian pitcher, says, "Camels are mild—the flavor's great!"

MICKEY MANTLE, Yankee slugger, tried Camels for 30 days. "I'm for Camels!"

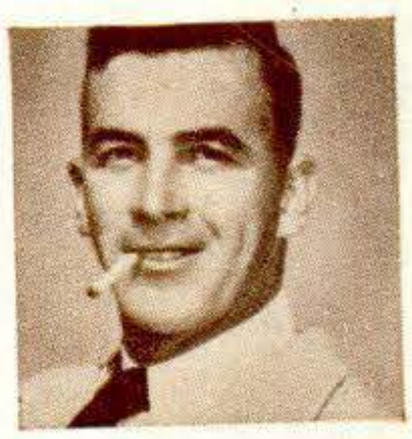
HARVEY KUENN, Detroit Tigers' flashy shortstop, says: "I go for Camels' flavor!"

MEL PARNELL, Red Sox pitcher, is a long-time Camel fan. "I'll never change!"

RED SCHOENDIENST, Cards' second baseman, says, "I'll take Camels' mildness!"

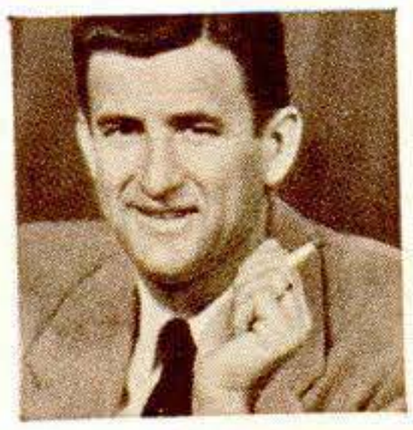
TED KLUSZEWSKI, Cincinnati Reds' slugging infielder, says: "Camels are richer!"

WARREN SPAHN, Braves' hurler says, "I'm for Camels' cool mildness!"



GRANNY HAMNER, Philadelphia Phils, says Camels have the "best flavor"!

EDDIE LOPAT, Yankee hurler, has smoked Camels for years. "Can't beat 'em!"



MICKEY VERNON, Senators' 1st sacker, says, "Camels' flavor agrees with me!"

for Mildness... for Flavor...

Camels agree with more people than any other cigarette!

- Year after year, Camels increase their popularity-lead over the second-place brand! Listen to Major Leaguers — listen to smokers everywhere—and you'll know why more people get more pure pleasure from Camels' mild, flavorful blend of costly tobaccos! Try Camels for 30 days — and *see!*

CAMELS FIRST IN SALES—
NOW LEAD BY RECORD

50 8/10%

Latest published figures* from the leading industry analyst, Harry M. Wootten, show Camels now 50 8/10% ahead of the second-place brand — biggest preference lead in history!

*Printers' Ink, 1954

R. J. Reynolds Tobacco Co.
Winston-Salem, N. C.

Copyrighted material